

FLIGHT

The
AIRCRAFT
ENGINEER
and
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:

Dec. 19 to ... Paris Aero Show.

Jan. 4, 1920.
1920April 18 to ... Seaplane Competition at Monaco
May 2June 1 ... Air Ministry Competition (Small Type Aero-
planes), Martlesham Heath

July, 1920 S.B.A.C. International Aero Exhibition at Olympia

Aug. 1 ... Air Ministry Competition (Seaplanes) Felix-
stoweSept. 1 ... Air Ministry Competition (Large Type Aero-
planes), Martlesham Heath**EDITORIAL COMMENT**

THE Air Estimates, which were presented to the House of Commons last week, call for very little in the way of comment. As we have already recorded, they show a decrease for the year of nearly twelve and a-half millions, amounting to £54,930,850, against the original forecast of £66,500. The saving has been effected by passing over to the Ministry of Munitions the cost

**The
Air
Estimates**

of liquidating all contracts placed by that Department, whereby a saving of 13½ millions has been shown. This, while it correspondingly lightens the Air Estimates, is manifestly a paper saving only, since it represents a national liability which has to be met by the Ministry of Munitions. A saving has been effected by the reduction of the programme in respect of buildings and land amounting to 1½ millions, and the Secretary of State in his memorandum says that "a further reduction of two millions has been effected in consequence of the programme of the Controller-General of Civil Aviation and the Director-General of Supply and Research being still in process of development and not having fully matured. In addition, it has been found possible to meet the requirements of these departments from existing stocks to a greater extent than was originally anticipated."

On the other hand, certain items show an increase of four millions over the forecast, and thus leave the Estimates, as has been said, over twelve millions to the good—on paper. The point that interests us most is that, so far as is discoverable from the Estimates, the amount of money expended on the development of civil aviation is represented by the sum of £38,523 allotted to the salaries and pay of the personnel of the Department of Civil Aviation. It is true that other sums may have been expended under other Votes, but they are not shown, and the inference must, therefore, be drawn that the "encouragement" of this essential branch of aviation is limited to the paltry sum named. This inference is further supported by the statement of the Secretary of State relative to the saving of a round two millions on this Department, and that of Supply and Research. If this is so, it is obvious that the want of policy to which we have so often referred has an even worse effect on development than we had thought. We trust that during the debates on the next Estimates the Government will be pressed for a definite statement of that policy; of how much money is to be devoted to the encouragement of civil aviation during the ensuing financial year; and of how and why it is to be allocated. The whole industry and all who have the future of commercial flight at heart are becoming gravely disquieted at the apparent want of interest manifested by the Government in a side of the movement which their

own spokesmen have admitted is vital to the future of the country and the Empire. If they have altered their outlook and no longer believe in the possibilities of flight—which is scarcely thinkable—let them say so, and leave it to private enterprise to fight its own battle. Alternatively, if it is simply a question of the evolution of a policy, then in Heaven's name let those who are responsible for its formulation get along with the work or give place to those who know their own minds.

Civil Aviation Abroad

If evidence were needed that the "Dilly and Dally" policy of our own Government is holding back development, it would be supplied by the review of the progress of civil aviation abroad, issued last week as an official document by the Air Ministry. It is quite clear that we shall have to encounter the most strenuous competition from other countries in which development is being assisted by subsidies from the State. In certain Allied and enemy countries enterprising firms, with the active support of their Governments, are sparing no pains to expand their business. Missions composed of Service *personnel* have been sent abroad by France and Italy to carry out missionary work on behalf of the native aircraft industry. Aircraft and representatives have also been sent overseas by British firms, but hitherto no official foreign mission has been despatched by the British Government. The reasons assigned for this are (1) A shortage of available Service *personnel* and a reluctance to confuse Service and civil enterprise; and (2) The traditional British policy that an industry should be left to develop as far as possible on its merits.

The first of these reasons gives us to smile! Surely, there is not—or certainly was not until many months after the Armistice—such a shortage of R.A.F. *personnel* that the Air Ministry could not have made a selection of the comparative handful of competent officers to compose not one, but half-a-dozen missions. The point about the reluctance to confuse the civil and the Service enterprise we can understand, even if we fail to appreciate it. It was this reluctance, coupled with the "traditional British policy," which sent our original Expeditionary Force to France in 1914 with, in comparison with the forces available to the enemy, a mere nucleus of an aircraft force. It was this same policy which saw us enter the war with two, or at most three, tiny airships of doubtful flying capacity, while Germany, who, with all her faults, has never been blind to the interests of the State when they have been identical with those of private enterprise, possessed a powerful fleet of rigid which it took us four years of research and experiment, aided by careful copying of German designs, to equal. We have no patience at all with "traditional policy" of this kind. We had thought the war had taught us how mistaken a lot of this policy was in the past, and that we intended to avoid such errors in the future. Apparently, the fine old crusted bureaucrats who still govern us have learnt nothing and forgotten nothing. While other nations are forging ahead with their aircraft policy, we have to be content to sit still, comparatively, and as we did before the war, follow them at a distance. We do not for a moment desire to infer that our own industry is not as fully alive as the industries of France, Italy and Germany, who appear to be

our most dangerous competitors. It is, and it is doing its level best in all the circumstances to maintain the lead we obtained during the war. But it is a young industry which still requires fostering through a very difficult period which lies ahead. The Government has agreed that it must be so fostered, and having agreed this it offers assistance by printing and circulating pious memoranda like the one under discussion.

What Others are Doing

Contrast the policy of the French Government with that of our own. The economic position of France is certainly no better than our own.

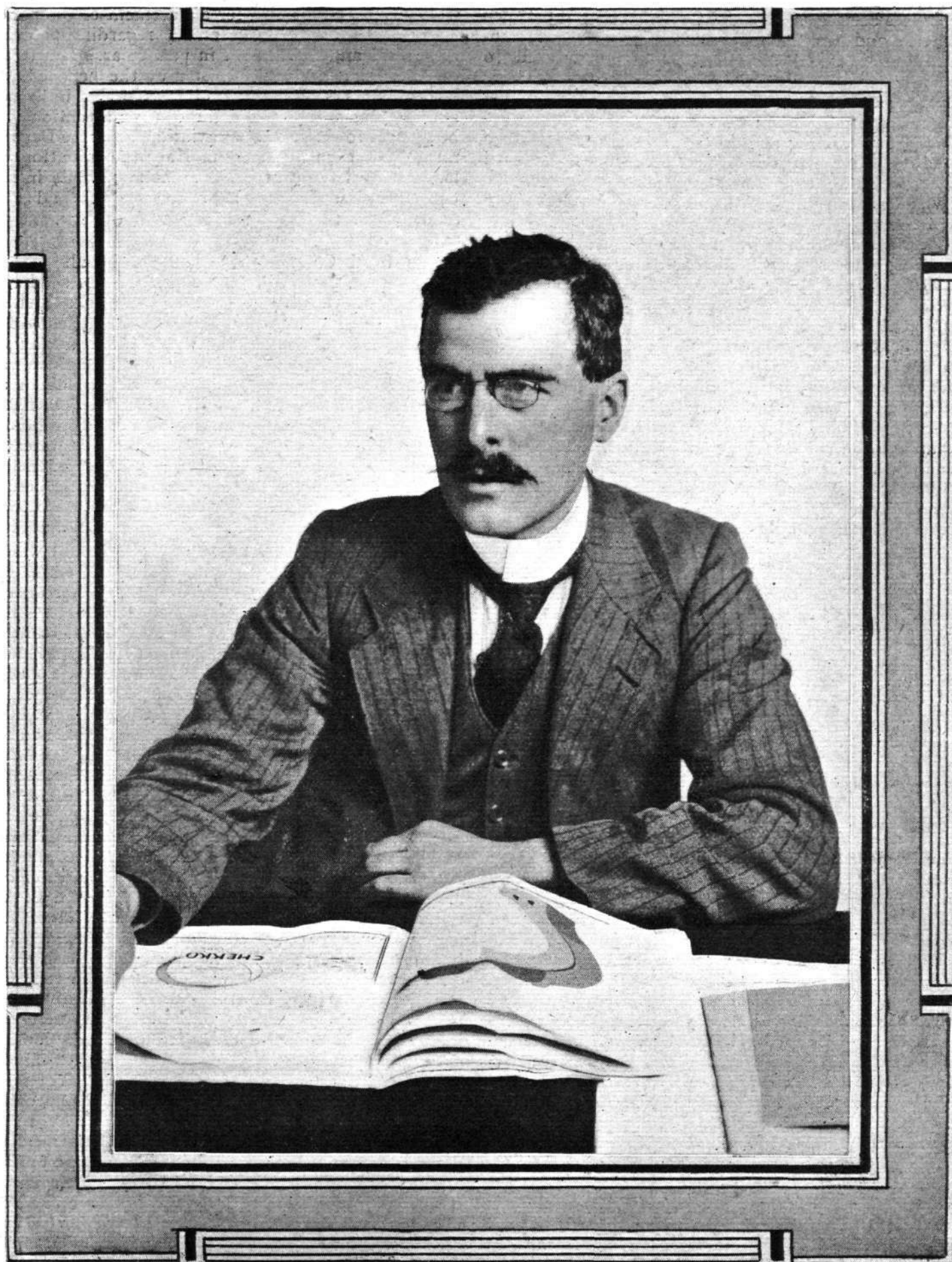
As a matter of fact, it is very much worse, as the rates of exchange demonstrate. Yet, says the memorandum, "The French are fully alive to the possibilities of aviation, and are making every endeavour both to secure foreign markets and assist internal development. They have followed their usual policy for the encouragement of new industries, and have adopted the principle of subsidies. A sum of, 18,000,000 francs, out of a total of 37,000,000 francs voted for civil aviation, has been earmarked for this purpose. The subsidies take the following form:—

- (a) Bonuses on distances flown (including flights by machines used for purely private purposes).
- (b) Bonuses to pilots and crew for good work.
- (c) Premium on tonnage carried.
- (d) Special bonus up to 25 per cent. per annum of the total value of machines of military type immediately available in emergency for use by the State.

Mail-carrying contracts have been given, the principal lines being Paris-London, Paris-Lille-Brussels and Toulouse-Rabat. Other internal routes are in operation, and an ambitious programme of projected routes is being prepared. In the Near East, military machines are carrying mails between Athens and Salonika, Salonika and Constantinople, Constantinople and Bucharest, and Bucharest and Galatz and Kichenef. Missions have been sent to the Argentine and Japan, while it is intended to despatch similar missions to China, Brazil, Finland, Greece, Peru, Poland, Roumania, Siberia, Switzerland and Turkey. It is also intended to carry out a firm airship programme, which includes the construction and operation of four rigid ships of 3,000,000 cubic feet capacity, with sheds at Paris, Marseilles and in Africa. The contemplated routes are from Paris to Marseilles, Marseilles to Africa, and later to South America *via* Dakar.

In Italy, civil aviation is going ahead apace, thanks again to the assistance of the Government. Germany, too, is making strenuous efforts to regain her footing in aviation. Partly to avoid the terms of the Peace Treaty, and partly to make an early bid for foreign markets, large numbers of machines and engines have been sold at very low prices to the Scandinavian countries, Holland and Switzerland, and there is no doubt Germany has secured a substantial footing in neighbouring countries. Germany seems to have recognised the fundamental truth that the country which is farthest advanced in the development of civil aviation will have the strongest reserve air force in time of war, and is straining every nerve to obtain the lead. Although no concrete air policy has been announced, the Government has granted certain mail contracts. Passenger services have been operated

Flight—And the Men



MR. JOHN KENWORTHY, Chief Engineer and Aeroplane Designer, the Austin Motor Co., Ltd.

more or less regularly. Airship services are carried out on alternate days between Berlin and Friedrichshafen, and it is intended to open shortly similar services between Berlin and Copenhagen and between Berlin and Stockholm. According to the Memorandum, the civil aviation policy is expected to be:—

1. That at first Government assistance in the shape of subsidies will be necessary.

2. That existing aerodromes and material will be retained, and privately-owned aerodromes acquired by the State, thus forming a strong nucleus for civil aviation under Government support and control.

3. That a combine will be formed of all firms for working purposes, each firm to standardise a type, and all types to be approved by the Government.

4. That there will be co-operation between military and civil services.

5. That propaganda will be employed especially in the State schools.

There is an aerial police in being and regular patrols are carried out. In order to keep touch with ex-Service flying men, an airmen's union has been established with branches at Baden, Mannheim, Karlsruhe, Frankfurt and other centres, and a German Air Fleet Union, similar in constitution to the German Navy League, has been formed to foster the national interest in aviation.

What are We Doing?

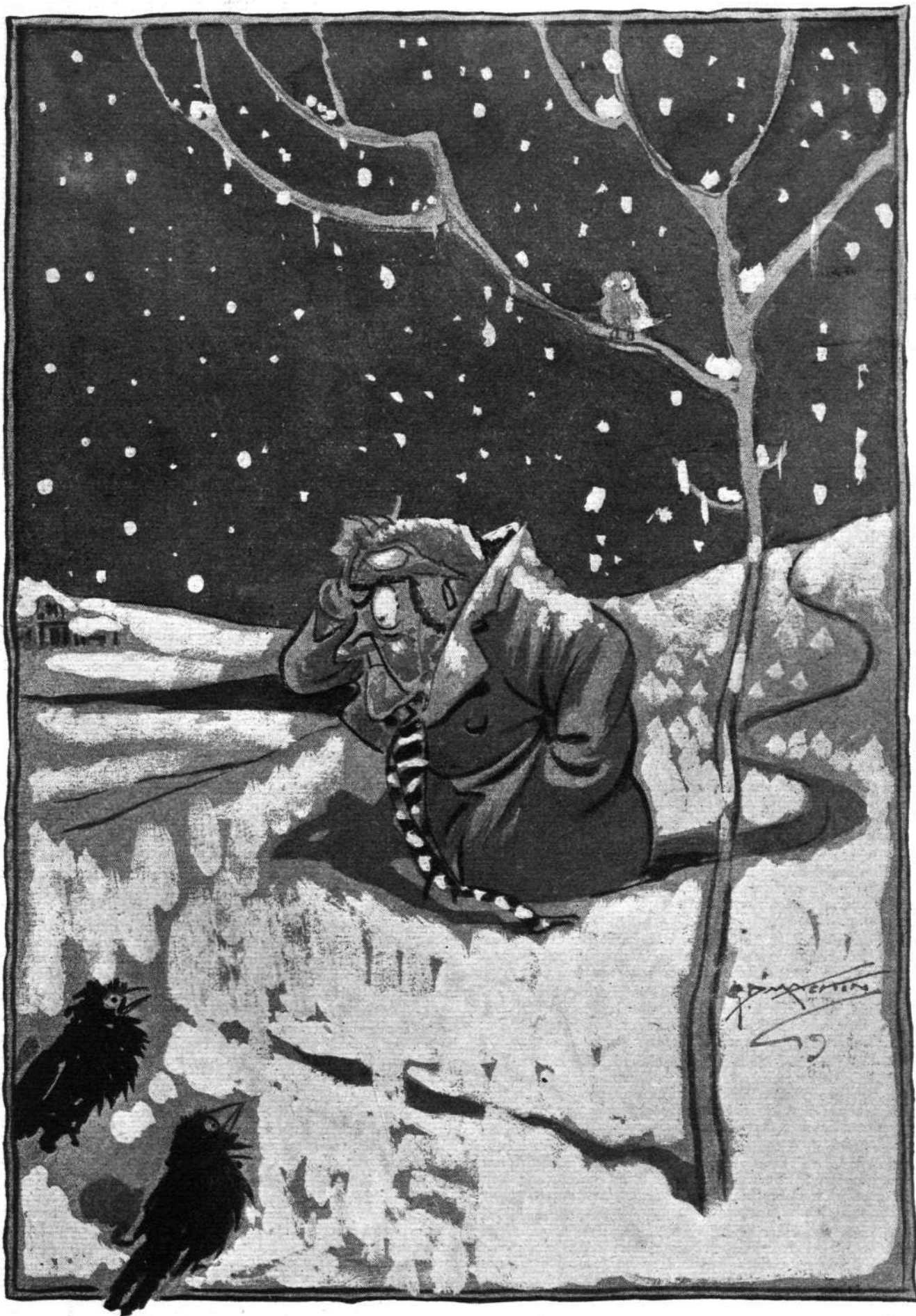
While all this is taking place abroad, what are we doing to foster the development of civil aviation? The Air Ministry seems to have its hands tied, and while there exists a Department of Civil Aviation—the first to be created—that Department appears to be powerless to formulate a policy. How far the fault lies with the Government themselves and with the Secretary of State, and how much is to be laid to the weakness of the Department, we have no means of knowing. But it is certainly a most deplorable position in which civil aviation stands, nearly fourteen months after the Armistice. Talk of encouragement there has been in plenty, but there has been nothing done by the Government to give the slightest encouragement to private enterprise. The Post Office, which might have been expected to show some imagination and insight, hangs fire in the matter of mail contracts. The one or two tentative contracts for mails which have been placed are so small and so ill-conceived that they amount to nothing. Nor is the attitude of the postal authorities even sympathetic to the idea of the carriage of mails by air. In effect, the reply of this Department to those who propose the inauguration of aerial services is: "Start your service and we will give 'sympathetic consideration' to any proposals you may have to make." In a word, the whole attitude is one of *non possumus*. We almost begin to despair of ever getting things going if we are to wait for Government encouragement. As a matter of fact, we think that private enterprise will do well to proceed along its own lines and cut out all idea of the promised encouragement. If the latter should, after all, materialise, it will be so much to the good. If it does not, the industry will not be disappointed, having made up its mind that the attitude of the Government is "Nothing Doing!"

Aviation in the House of Lords

In the House of Lords last week Lord Montagu of Beaulieu raised the question of the resignation of General Seely and asked for a statement of the policy of the Government regarding aviation in general and the R.A.F. in particular. He deprecated placing a single Minister at the head of two Departments of State, and pointed out that in France and Germany, where a great deal of attention was being paid to the subject of aviation, separate Departments had been formed; in Italy the intention, so far, was to have a separate Ministry; while in the United States a very able Commission had also reported in favour of a separate department of aviation.

The Lord Chancellor replied on behalf of the Government, but it cannot be said that he shed any fresh light on the immediate intentions of the Government. He simply repeated that the reasons for General Seely's resignation were stated at length by the ex-Under-Secretary himself and that there was nothing, therefore, to be added. He explained at some length the reasons which led to the appointment of Mr. Churchill to the dual offices he now holds, but told the House nothing that was not already known. He reiterated that there was no intention of going back to the state of things existing before the R.A.F. became a separate service and with that assurance the House had to rest content.

One thing, however, Lord Birkenhead said which had a disquieting tone. The day might come, he said, when the Board of Trade would assume control of, and responsibility for, civil aviation in the same way that it had assumed control over the mercantile marine. Anything worse than such a prospect is scarcely to be imagined. When it is properly realised what a blighting effect is exercised by the Board of Trade over the mercantile marine; how its regulations harass and hamper development and place the British shipowner at a disadvantage with his competitors, all who view the future of aviation with goodwill must pray that no such undeserved fate may overtake it. We do not want to see the interests of aviation in the hands of a Board of Trade, of which the Speaker of the Irish House of Commons and the Archbishop of Canterbury are *ex-officio* members! As we have indicated, the Lord Chancellor's reference to Board of Trade control of the mercantile marine was singularly unfortunate. We believe it is the case that not a single British shipowner or ship-master but would vote for the removal of the incubus of its control and the institution of a properly equipped Ministry of Shipping if it were put to him. It is in spite of Board of Trade control and not because of it that the British mercantile marine holds the proud position it does. Yet it is to this Department that the Government apparently visualises giving the control of aviation. Why, when we have an Air Ministry with its own Department of Civil Aviation? We do not know—nor do we understand the position at all. In one breath the country is assured that it is not the intention to make any change from the present manner of administration. In the next a complete change of policy is foreshadowed, and we really forget where we were yesterday. We are more than ever convinced that so far as concerns the aviation policy of the present Government it may be described as a paradox—it hasn't any.



ANOTHER MACHINE WRITTEN OFF! "Where on earth did I leave that bantam 'bus of mine?"



BY OUR SPECIAL COMMISSIONER. (BY AIR MAIL EXPRESS)

GRAND PALAIS, CHAMPS ELYSEES,

December 18, 1919.

ALL is bustle and—apparently—confusion. The chug-chug of lorry engines and the honking of horns resound within the Grand Palais, which is to open its doors at 10 o'clock tomorrow morning on the first Aero Exhibition, held here since 1913. Packing-cases are being opened and lorries constantly deliver new supplies containing wings, fuselages, engines and air-screws. At the moment of writing there are, practically speaking, only two stands which have any resemblance to being in order or nearly so. These are the Bleriot-Spad and the Handley Page, which are situated next to one another. After a brief chat with Mr. Cogni, *charge d'affaires H.P.*, we saunter along, trying to get an impression of what tomorrow's finished exhibition will look like. We pause before the Nieuport stand on which three very racy-looking machines are exhibited, one of which is said to be the record-breaker on which, a few days ago, M. Sadi Lecoq did a speed of about 192 m.p.h. over a measured course. M. Lecoq, it might be mentioned, has now transferred his affections to the Nieuport firm, and it was on a Nieuport that he put up this extraordinary performance. Just as we are inspecting this record-breaking machine, M. Lecoq himself comes along, and we congratulate him on his achievement. With a typically French gesture, he indicates that it is nothing to speak about, that the piloting is a simple matter, and that the whole credit rests with the machine. However, there is not at present time for any lengthy discussion, and other exhibits are claiming attention.

While making our way around empty packing-cases and over the half-completed floors of unfinished stands, we run into—almost literally—Col. Meares, who has sad news to tell about the fate of the Westland Limousines. It appears that these are fog-bound at Lympne in Kent, and there is now little chance of them arriving at the Grand Palais in time for the opening of the show. Two machines are expected, one of which is to be exhibited while the other is to be flying at Le Bourget aerodrome. Capt. Keep is in charge and will make the crossing if it be humanly possible. We try to cheer up Col. Meares with a quite innocent "Keep smiling," and he retaliates by accusing us of making horrible puns, with intent to commit a joke. Protesting our innocence, we leave Col. Meares to his own thoughts and wend our way to the Boulton & Paul stand, where we find Mr. J. D. North busy with paint pot and brush putting a few finishing touches on the all-metal Boulton & Paul P. 10. However, we persuade him to put down the brush and explain something about the construction of this extraordinarily interesting machine. This he agrees to do, and as the designer of the machine he does it with authority. The Boulton & Paul P. 10—although designed and built in a very short time—is the result of very long experience in rolling sheet steel into special sections, and

it represents years of painstaking experiments and research work. It may be said without fear of offending anyone that the P. 10 probably marks the greatest step forward in aeroplane construction of any machine at the Show, and the few French attempts at metal construction are at least two years behind it.

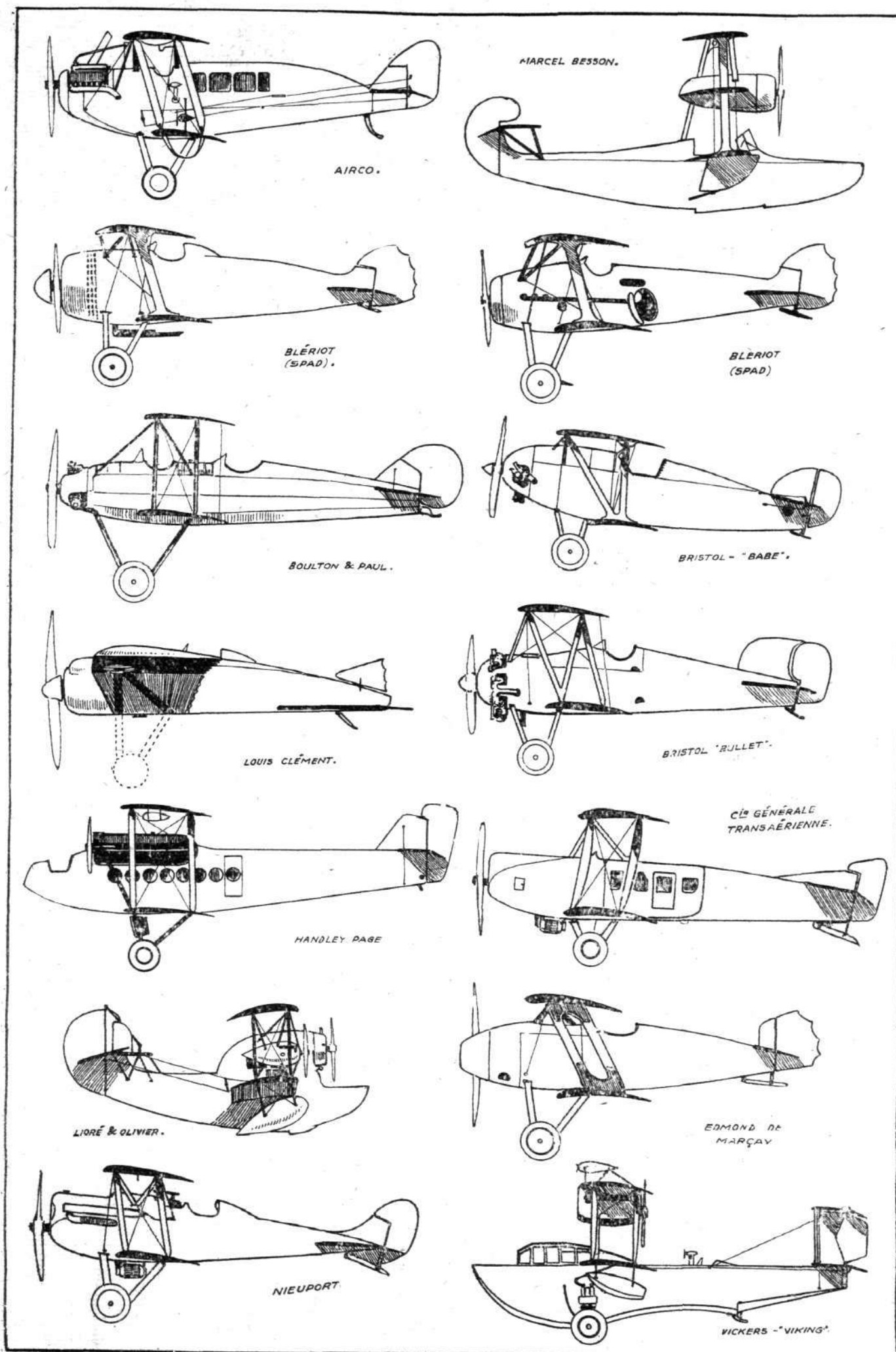
In the middle of our enthusiastic examination of the P. 10 we suddenly remember that at home thousands of FLIGHT readers are looking to us to provide them with at least a brief *résumé* of the main exhibits in next week's issue of FLIGHT, and that as we go to press two days earlier on account of Christmas there is no time to spare if we are to make the necessary round of the stands to enable us to do this. We, therefore, reluctantly tear ourselves away and look in at the Vickers stand.

Here the main exhibit which has arrived so far is the saloon of a Vickers-Vimy Commercial. Otherwise it is much the same tale as that of the Westland machines, except that the Vickers is at Brooklands, waiting for the fog to lift. Some clear photographs on the stand give, however, an excellent idea of the machine—a Vickers Viking. She—one uses the feminine appellation instinctively from force of habit in spite of the name—is a two-stepped flying boat and carries her retractable land undercarriage about with her so as to be able to alight on either element. Excellent as this feature is, it does not enable her to brave the fog, and hence the actual machine will probably not be at the show when it opens tomorrow morning.

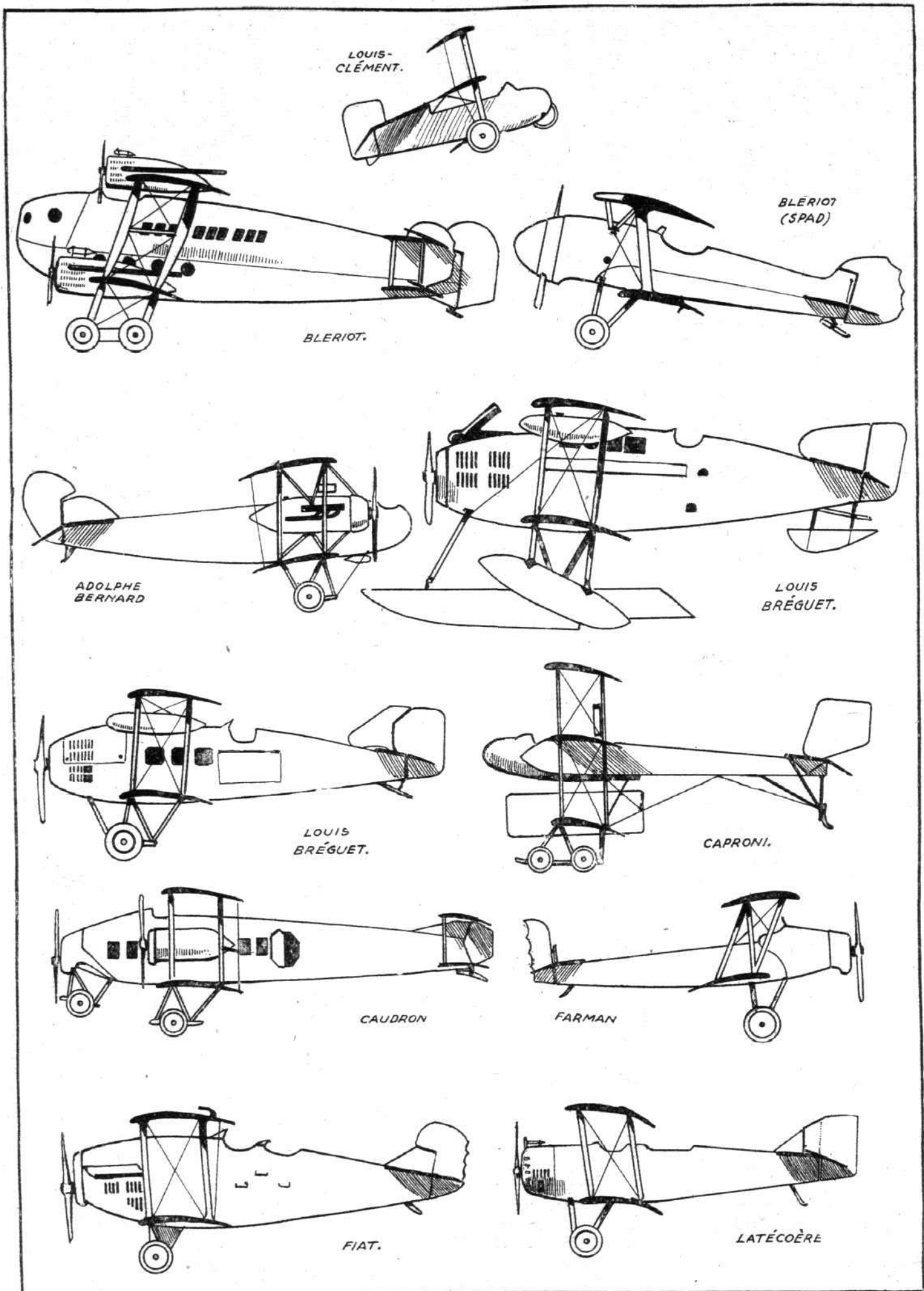
On leaving this stand we catch sight of Capt. Barnwell, who informs us that he has just had a sad disappointment. He had fondly imagined that the Bristol "Babe" would be the smallest machine at the Show, and has now discovered that one of the machines on the de Marçay stand is considerably smaller. We are able to offer him a certain amount of consolation by pointing out that whereas the "Babe" has flown—and flown very well—rumour has it that the little de Marçay only did straight, and appeared to have a ceiling of about 6 ft. (six). This may be—like the death of Mark Twain—greatly exaggerated, but certainly the machine looks as if it could do with a little more wing surface.

A hurried glance at the Airco stand shows the beautiful white fuselage of the new Airco 16, with Napier Lion engine just arriving. One cannot quite judge of the machine without the wings, but it promises to look extremely graceful when erected.

From the Airco stand we proceed to complete the circuit, and in another half-hours' time we have gathered sufficient material to be able to compile some sort of an index of the main exhibits. As our round has been a hurried one we do not claim absolute completeness, but we feel that readers will prefer a brief and possibly somewhat incomplete *résumé* of the exhibits generally to a complete reference to the machines on a few stands. In subsequent issues we trust



AT THE PARIS SHOW: Silhouettes of some of the British and French machines on view.



AT THE PARIS SHOW: Silhouettes of some French and Italian machines on view
The Clement and Caproni triplanes were sketched before the engines were put in place.

to be able to deal with individual machines in considerable detail:—

Aircraft Manufacturing Co. (Airco).—Main exhibit is the Airco 16, which was briefly described in last week's issue of *FLIGHT*.

Ansaldo.—This stand is empty at present, owing, it is said, to the machines being fog-bound somewhere in Italy or the South of France.

Bleriot and Spad.—So far the only Bleriot machine is the large 4-engined biplane which has already been illustrated in these columns. Aerodynamically one does not like it at all, with its engines spread about as they are. The machine is—in some respects—very reminiscent of the ill-fated Tarrant.

Sheltering more or less under the wings of the large Bleriot are three small Spad machines, particulars of which will be found elsewhere in this issue.

Boulton and Paul.—The main feature of this stand—and from a constructional point of view of the show—is the all-metal P 10.

Bristol.—At the time of writing the Bristol Bullet and the Bristol Babe are ready on the stand. The Tourer has not yet arrived but is expected at any moment.

Louis Bréguet.—Three machines ready. One is a military type XVII C 2, the second is a tractor seaplane with enclosed cabin, while the third is the "Berline" referred to elsewhere in this issue.

Adolphe Bernard is showing a large twin-engined tractor biplane. One somehow imagines there is more to come, but up to the present this machine is in sole possession.

Caproni.—This Italian constructor is showing one of his huge three-engine triplanes of the twin-fuselage type, with two tractor engines in the fuselages and one pusher in the central nacelle.

Caudron.—The Caudron exhibits are referred to elsewhere. At the time of writing two machines are erected on the stand; one is the huge three-engined cabin machine, the C 25. This machine has two engines on the wings and a third in the

nose of the fuselage. There is a large cabin in the fuselage. The wing bracing is in the form of piano wire, which looks somewhat out of place in a modern machine, especially of such dimensions. Of the school machine there are no signs at present.

Louis Clement.—At the time of writing the only thing on this stand at all resembling an aeroplane is a little triplane with a two-wheeled undercarriage and a third wheel in the nose of the fuselage.

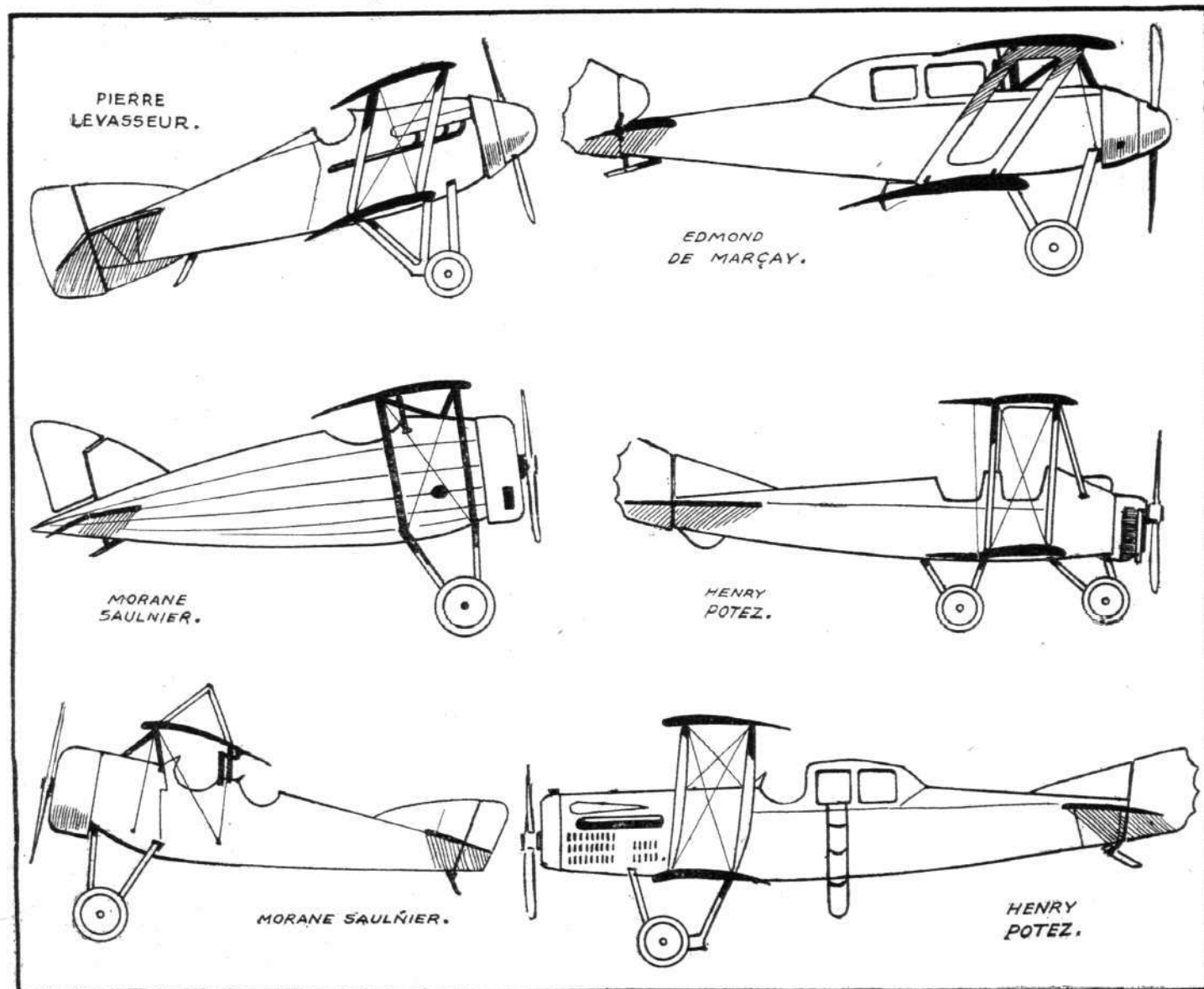
Louis Clement is also showing an extraordinary monoplane, whose wings are of the cantilever type. There is a break in the wings, the roots having a large dihedral and then straightening out. A horizontal cross-tube to the body forms the bracing. The Vees of the undercarriage can be swung outwards, and the wheels then disappear into the wings. The machine looks a freak, pure and simple.

Farman.—Elsewhere in this issue will be found a brief reference to the Farman exhibits, which consist of three machines, all ready-erected. In point of size the large "Goliath" takes first place, but it is probable that the small sporting machine sitting under the wings of the giant will prove more interesting in many ways. The third machine is a school 'bus, which looks rather odd nowadays; one has quite got unused to seeing "pushers."

Fiat is represented by a large tractor biplane, type "ARF" two-seater. This machine has a very deep and wide body, probably mainly in order to accommodate the large tanks, as the crew consists of the pilot and one passenger. The machine has aileron balances of the type consisting of small auxiliary planes mounted on brackets above and slightly ahead of the aileron proper.

Latécoère.—On this stand there is one single-engined two-seater biplane which, according to the legend painted on the side of the fuselage, is designed for mail carrying. The machine does not, on casual inspection, appear to offer any features of particular interest.

Lioré and Olivier.—This firm has a very striking exhibit



AT THE PARIS SALON: Some more silhouettes of the machines on view

in the form of a large three-engined flying boat, with the hull forming an enclosed cabin. The wing bracing is in the form of slanting struts forming a triangulated structure in conjunction with the wing spars. The whole machine gives a very businesslike impression. On this stand there is also an armoured fuselage, with rear portion built up of duralumin tubes, much after the fashion of the German Junkers

Pierre Levasseur.—In addition to a number of propellers, including a huge one of about 40 ft. diameter, is showing a large single-engine tractor biplane, the chief feature of which appears to be a profuse use of aluminium for cowling, spinner, etc.

Edmond de Marçay has a very striking exhibit, consisting of three very pretty biplanes, all very small. The smallest of them is, perhaps, the smallest biplane ever built, and, as we have already mentioned, looks as if another 20 sq. ft. of wing surface would not do it any harm. The second machine is an extremely neat-looking single-seater with monocoque fuselage and rotary engine with a spinner over the propeller boss. The third machine, although the largest of the three, is also quite small, and is a limousine in as far as the upper third of the passenger occupies a cabin-like superstructure added to the top of the fuselage. The lower two-thirds of the passenger, or his better half, travels *en fuselage ordinaire*.

Morane-Saulnier.—This firm is making rather a speciality of "parasol" monoplanes this year, no less than three machines of this type being exhibited. In addition they are showing the body of a military type biplane. One of the monoplanes has the ordinary wire bracing to its wings, the top bracing going to a single central king-post. The other, which is very similar to it, is a two-seater, also with rotary engine. The third monoplane has its wings braced by slanting tubes, and there is consequently no top bracing, the tubular struts working in compression under anti-lift loads. All the Morane-Saulnier machines are finished in a dull khaki colour.

Nieuport.—Three complete machines are shown on this stand, and in the background, so to speak, is the fuselage of a fourth. One of the Nieuports is a single-seater chaser with its complement of machine guns, telescopic sights, etc. The second machine is a little single-seater biplane with rotary engine, while the third is the racer on which M. Sadi Lecointe attained a speed of 192 m.p.h. recently. The fuselage of this machine is of the monocoque type, very carefully streamlined. There is a tiny square radiator in the nose of the fuselage, looking wholly inadequate for its work, and, as an after-thought, a second radiator—of the "lobster pot" type with which the Schneider Cup machine was fitted—is mounted on the port undercarriage strut. The machine is mounted so as to give the appearance of being on a banked turn, and looks very neat.

Handley Page.—Painted in white enamel, the new H.P. W 8 looks extremely well, and will undoubtedly prove a great centre of attraction when the exhibition is opened. The machine was flown across from England, and it was one

of the first to be ready, erected on the stand. The cabin is very comfortable indeed, and quite a good view is obtained through the port holes in the sides of the fuselage. Purely regarded as an aeroplane, the W 8 is also, we think, a great improvement on the older types, and it is certainly of much more pleasing appearance.

Henry Potez.—Of the two machines shown by this constructor one is a limousine, with the pilot in front of the cabin. The second is a little two-seater with 50 h.p. Potez engine and four-wheeled undercarriage. The engine is a four-cylindered air-cooled, with the cylinders in line, but the engine is placed with its crankshaft vertical, and drives the airscrew through a bevel reduction gear.

Vickers.—At the time of writing, the Vickers Viking is fog-bound at Brooklands, and the only exhibits on this stand are a Vickers Vimy-Commercial cabin, a number of B.L.I.C. magnetos and a series of scale models of Vickers aeroplanes and airships.

Westland.—A Westland limousine is to be exhibited, but at the time of writing it had not arrived.

The French Government Exhibits

CERTAINLY not the least interesting and instructive section of the French Salon is the display of the French Naval and Military Aviation Department under the *Coupoles* d'Antin. It comprises eight pre-war machines, a 1908 Voisin-Delagrange, a 1909 Santos Dumont, a 1910 Nieuport, a 1912 Henry Farman, a 1913 G. B. Deperdussin, a Bleriot two-seater, a R.E.P. two-seater and a Caudron G. 3. There is also a collection of 1/10 scale models of such historic land machines as the Antoinette, Borel, Nieuport, Tellier, Deperdussin, Astra, Zodiac, Bleriot, Caudron, Rep, Spad, Farman, Hanriot, Breguet, and among the water planes are Fabre, Borel, Hanriot, Tellier, etc. There are also models of the Charles Renard machine of 1872 and the Victor Tatin of 1879. In the airship division there are a number of cars as well as models of the 1884 Renard and Krebs *La France*, the 1906 Santos-Dumont No. 6, as well as several of the more recent vessels built for the French Government. There is also a fine display of balloons, parachutes, etc.

In another gallery are arranged some 32 motors, 20 of them showing the development of the aeroplane engine from the 50 h.p. Antoinette of 1907 to the 250 h.p. Salmson of 1917, while the other dozen are airship motors starting with the one used by Col. Renard in 1893.

Maps, instruments and apparatus used by the meteorological photographic and medical branches of the aviation services also find a place in this most comprehensive display.

The Show Opened

THE Show was formally opened on December 19, by President Poincaré, who was accompanied by Marshals Foch and Pétain; Generals Berdoulat and Mordacq and many other notabilities. The President made the customary tour of the stands, and before leaving congratulated M. Alfred Leblanc, President of the organising committee.

THE DEATH OF SIR JOHN ALCOCK

It is with most profound regret that we have to record the fatal accident to Sir John Alcock, which occurred on the afternoon of December 18, while he was engaged in taking a new Vickers machine to Paris in connection with the Salon. It appears that the machine when nearing Rouen had great difficulty in negotiating a strong wind. A farmer at Côte d'Evrard, about 25 miles north of Rouen, saw the machine come out of the fog, commence to fly unsteadily, and—it was then about 1 o'clock—it suddenly crashed to the ground. Sir John Alcock was taken from the wreck, but unfortunately there was considerable delay in getting medical assistance as the farmhouse near where the crash occurred is out of the

way. As soon as the accident was reported, doctors rushed from No. 6 British General Hospital, Rouen, but they were too late. It is probable that an enquiry will be held by the French authorities, at which the Air Ministry and Messrs. Vickers will be represented. Arrangements are being made for the conveyance of the body of Sir John Alcock to England for burial in Manchester, his native city.

The death of Sir John Alcock is an irreparable loss to aviation. His great flight across the Atlantic is too fresh in the mind of readers of FLIGHT for further reference to be made to it here, while his previous work is recorded in the pages of past volumes of this paper.

A New Michelin Prize

JUST previous to the opening of the Paris Salon, M. M. Michelin announced the offer of a new prize of 500,000 francs for aviation. The conditions briefly are that, starting from a point within a radius of 10 kiloms. of the Palace of Versailles, the aviator must fly to and round the cathedral at Rheims and back to his starting point in 1 hr. 15 min., having averaged a speed of at least 200 kiloms. per hour. Then from this point, but without landing, the machine, at an altitude of not more than 100 metres, must take at least one hour to cover 10 kiloms. over a triangular course, each side of which is 3.6 kiloms. long, the turns being effected inside the angles of the triangle. Throughout this test the machine must be kept in a normal flying attitude. Finally, the machine must

be kept in the normal position of flight and it must completely stop without serious damage to the structure not more than five metres from the point at which it first touches the ground. The contest will be held under the auspices of the Aero Club of France and will be open until October 1, 1930. Only French aviators are eligible.

New Speed Record

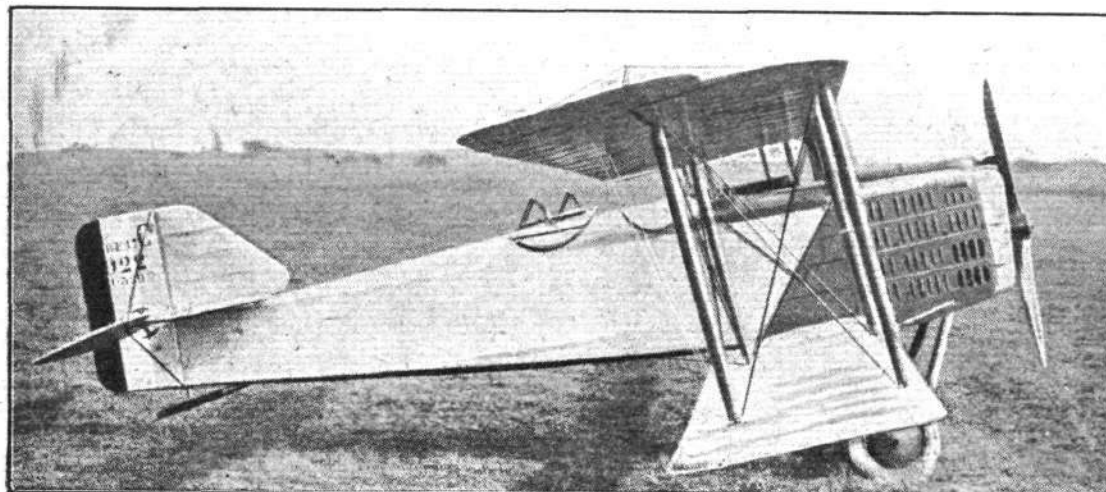
A new speed record is claimed by M. Sadi-Lecointe, who is now with the Nieuport firm. Timed, officially, over a measured kilometre at Villacoublay on December 15 his average speed is given as 307.225 kiloms. an hour (190.4 m.p.h.). It is stated that at one time he was flying at a speed of 364.555 kiloms. an hour—over 226 miles an hour.

SOME FRENCH MACHINES AT THE SHOW

Société Louis Bréguet

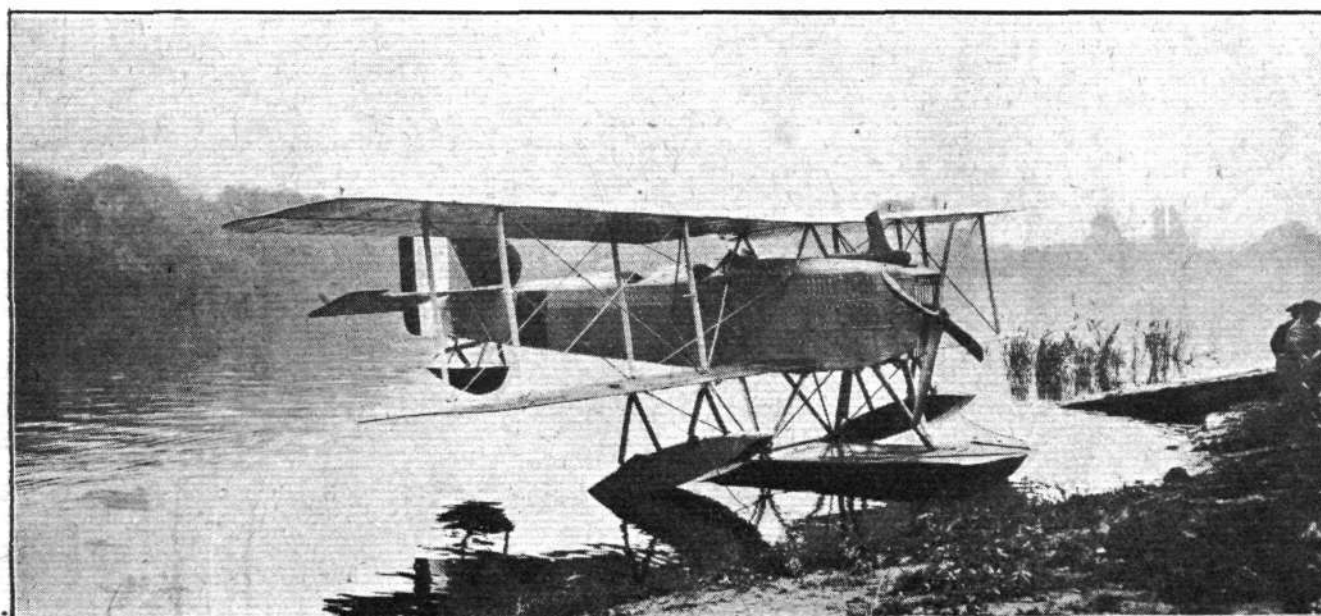
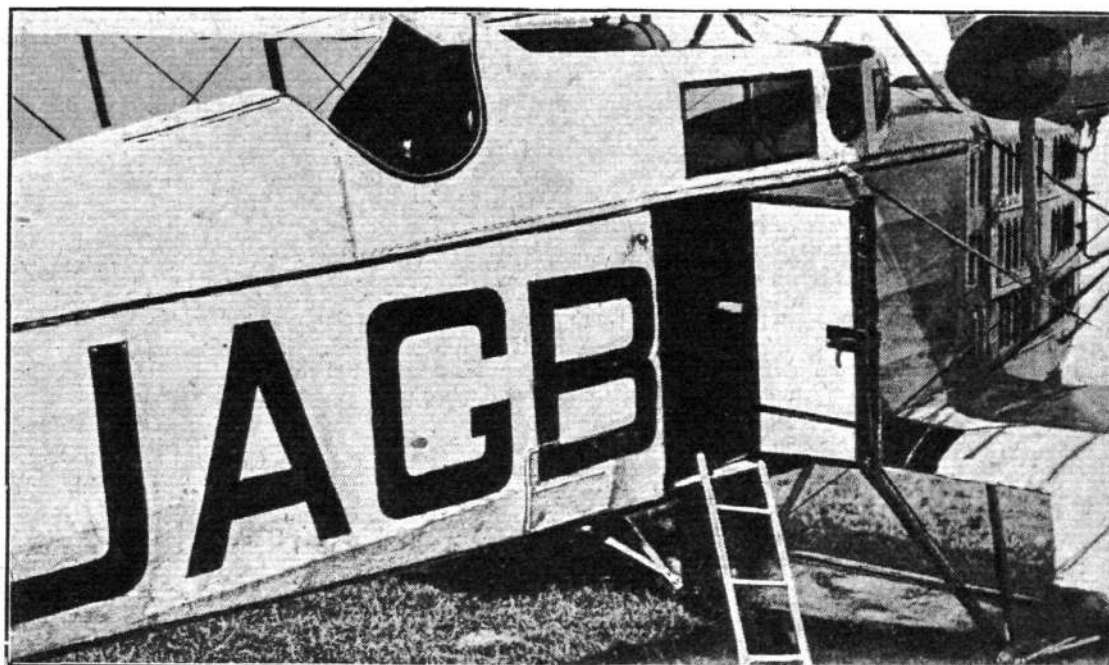
THIS firm is showing three complete machines and one very interesting power unit. One machine is a military two-seater fighter of the famous C 2 XVII type. A seaplane of

the A 2 XIV type is also shown, as well as a transport machine of the "Berline" type, XVIII T. This machine, which is a development of the Bréguet night bomber, carries six passengers, in addition to the pilot. The engine is a 450 h.p.



The Bréguet C 2,
 type XVII, 450 h.p.
 Renault engine

The cabin of the
 Bréguet limou-
 sine



The Bréguet seaplane

Renault, with which the machine is capable of a speed, at low altitudes, of 160 kilometres per hour (99 m.p.h.), and a climb of 10,000 ft. in 40 mins. The range is four hours at full throttle, or about 400 miles.

The power unit to which reference has already been made, consists of a novel transmission gear, by means of which the power of four engines of 200 h.p. each is transmitted to a single shaft on which is mounted the airscrew.

Aéroplanes Caudron

René Caudron is exhibiting three complete machines. One of these is the well-known type, G 3, on which so many of the French pilots have been trained. It was, it may be remembered, on a similar machine that the late Jules Vedrines landed on the roof of the Lafayette building. The machine is already so well known as to need no detailed description here.

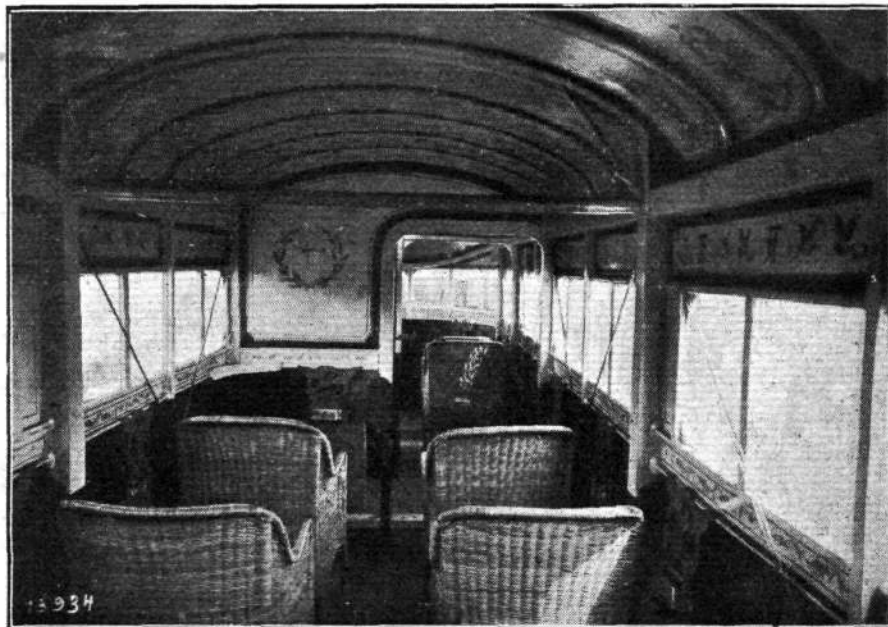
The second machine is a twin-engine biplane, type C 33. It is fitted with two 80 h.p. Le Rhone engines. In addition to the pilot the machine carries three passengers, of whom two are inside the body. This machine has a length over all of 30 ft. 10 ins. and a span of 51 ft. 2 ins. It carries sufficient fuel for a flight of six hours' duration, and has a maximum speed of 150 kilometres per hour (93 m.p.h.).

The third machine exhibited by Caudron is also a new design, the C 25. This is a large three-engined biplane designed for passenger-carrying. In addition to two pilots, it has accommodation for 16 passengers in a comfortable cabin. Like the C 33 it has a duration of six hours, and its maximum speed is 102 m.p.h. The overall length is 62 ft. 8 ins., and its span 82 ft. 6 ins. The three engines are 250 h.p. Canton-Unnés.

Farman Frères

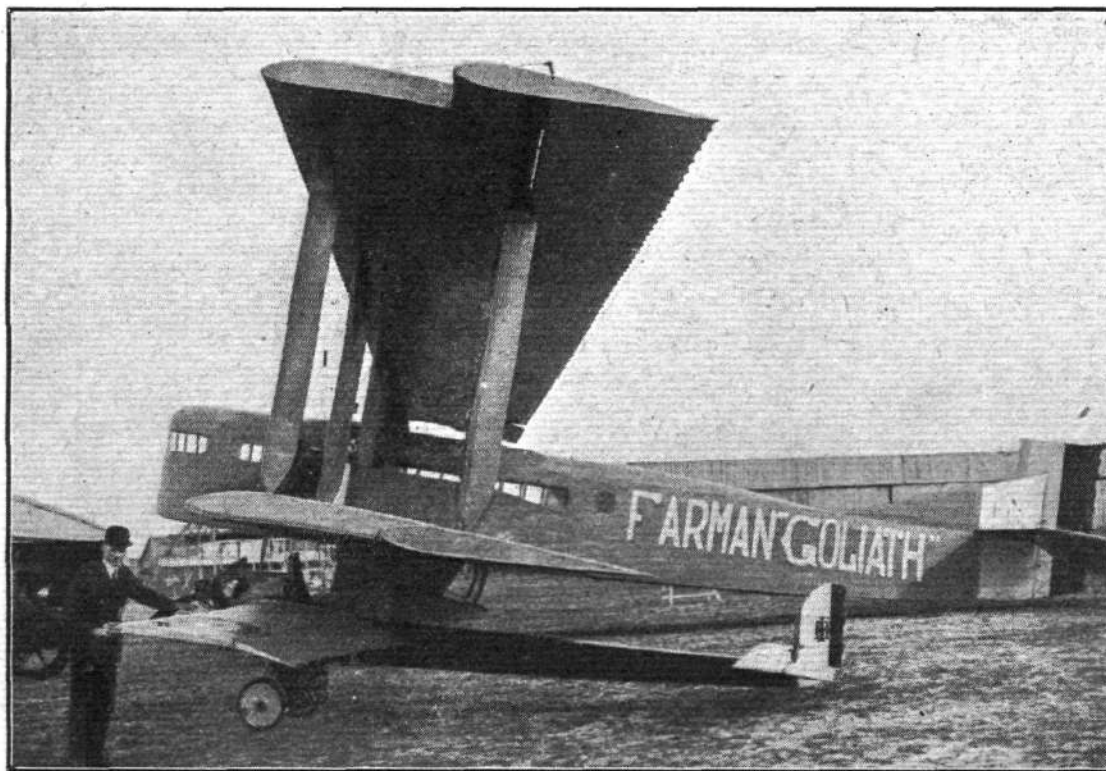
The Farman brothers are showing three complete machines. One of these, at least, will be known to our readers, as it has been flying for some considerable time and has made several notable flights. This is the Farman "Goliath," or, to give it its proper series number, the F 60. As is, of course, well known, it is a twin-engined machine, with a long enclosed fuselage accommodating the passengers. The machine has already been described in *FLIGHT*; suffice it therefore to add that the Goliath is listed at 170,000 francs (about £4,250 at the present rate of exchange). The machine claims several records, such as 20,800 ft. in 1 hour 5 mins. with four passengers, 20,500 ft. in 1 hour 5 mins. with 14 passengers, and 16,850 ft. in 1 hour 15 mins. with 25 passengers.

The second machine exhibited by Farman is a school biplane, similar in a general way to the pre-War pusher Farman. It has a short nacelle, in the stern of which is installed the engine. Dual controls are fitted, as in the majority of school machines, and it is claimed that it is almost impossible to turn the machine over on the ground, since not only is the wheel track very wide, but also the skids are provided with wheels in front, thus assisting materially in preventing a turn-over. One of our photographs shows the nacelle and front wheels.



THE FARMAN GOLIATH: View inside the cabin

Last, but by no means least, there is on view on the Farman stand the little sporting biplane about which so much has been heard of late. This machine—a small biplane—has been designed to provide a two-seater of low initial price and ditto upkeep. The sporting machine is said to be capable of looping with two up, and owing to its very light weight (about 880 lbs. "all up") it lands very easily and slowly (at about 28 miles an hour it is claimed, although this does certainly appear a little optimistic). With its 30 h.p. engine it is said to have quite a good speed, and the makers estimate the running cost at something like 13 centimes per kilometre.

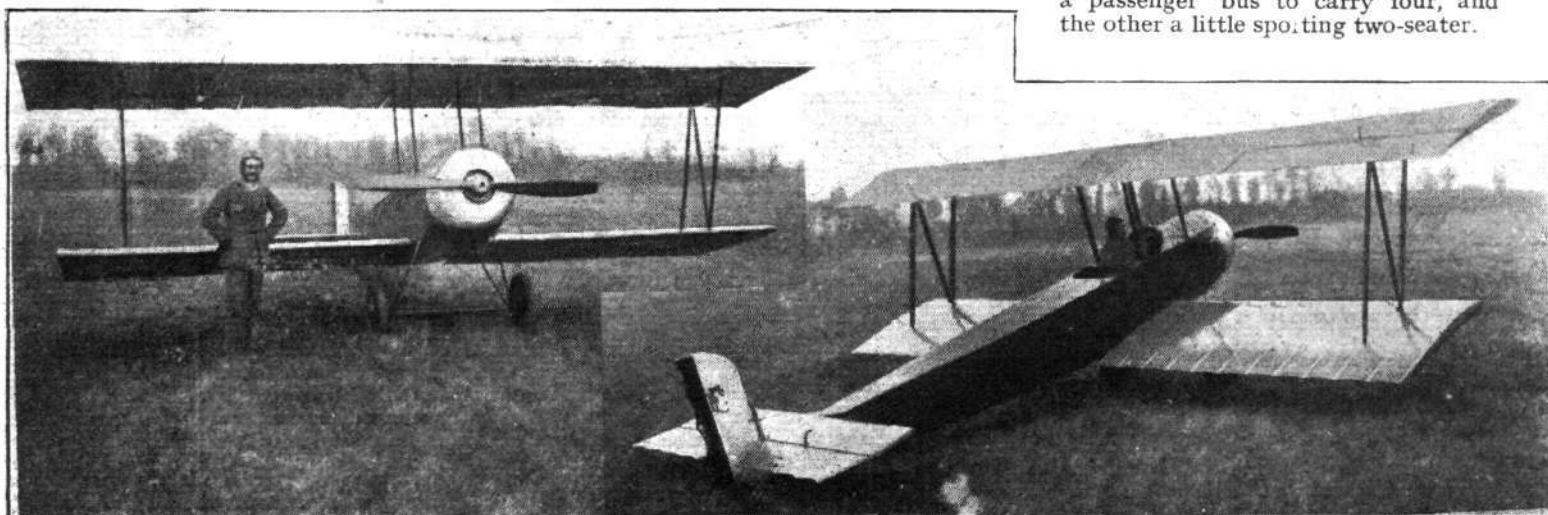


The Farman Goliath: Side view

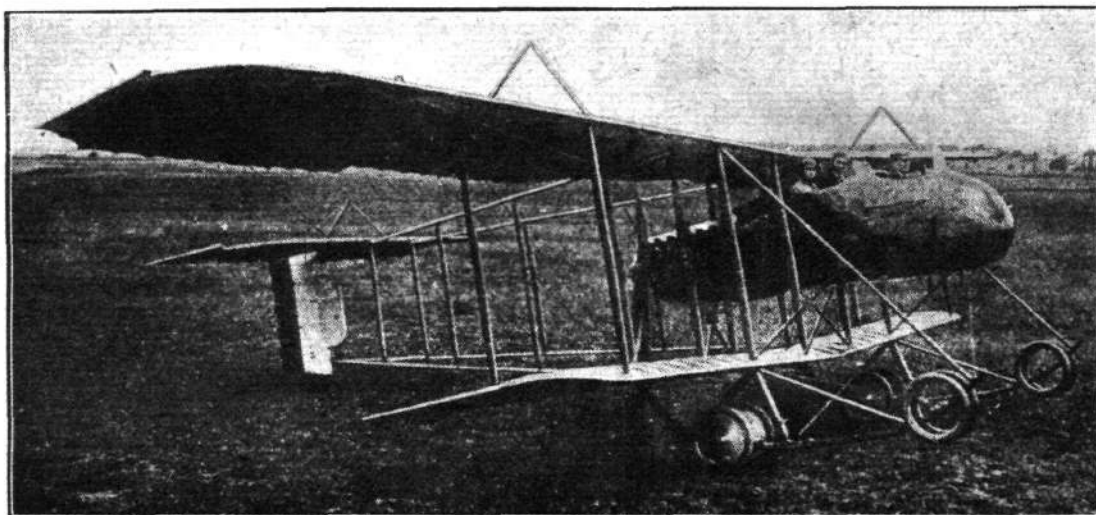
Aéroplanes Henry Potez

This firm is a newcomer into the aviation industry, as far as pre-War aviation is concerned. It is one of the firms

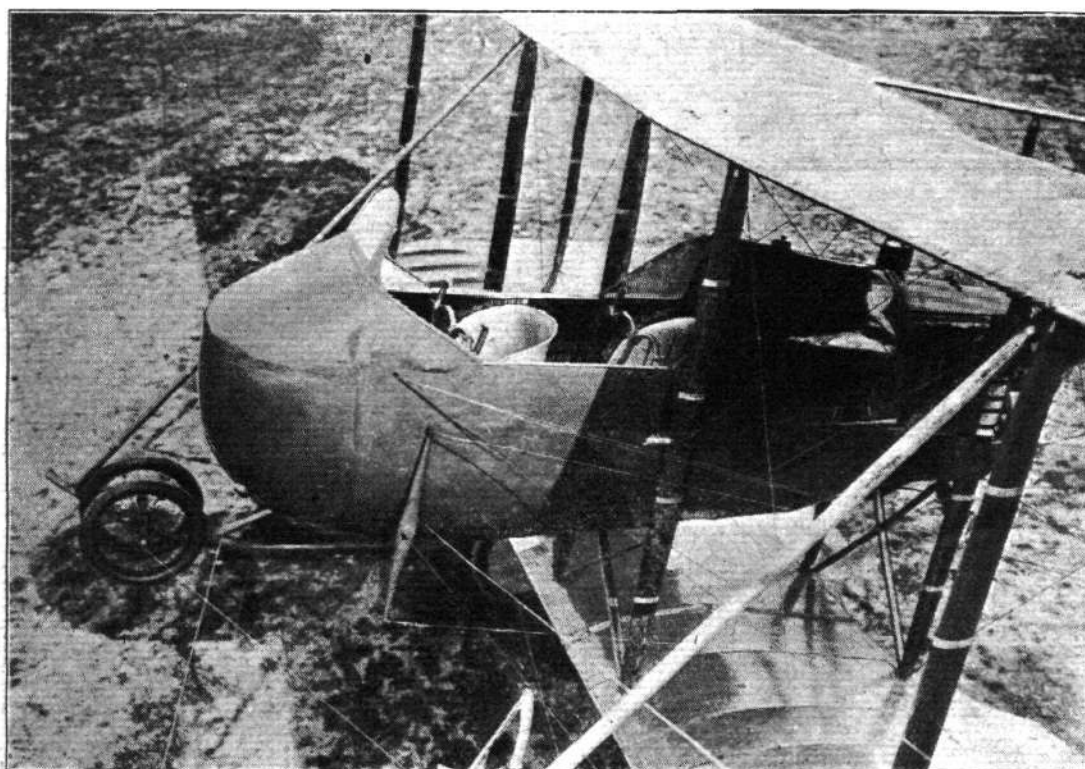
which had not turned their attention to aeroplane construction until the War demand arose. It will, therefore, be of some interest to watch the future of the firm. At the Paris Show they are exhibiting two machines, one a passenger 'bus to carry four, and the other a little sporting two-seater.



THE FARMAN SPORTING BIPLANE : Three-quarter front and three-quarter rear views

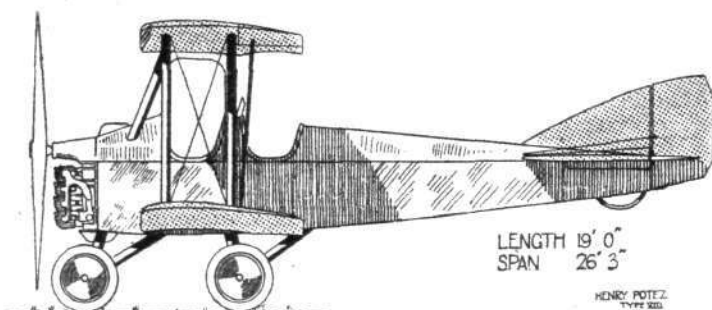


The Farman " School " type biplane, which is also suitable as a three-passenger " Tourabout "



The Farman
School Machine :
View of the
nacelle

The former—type S.E.A. VII it is called—is an enclosed biplane with seating accommodation for two or three passengers in addition to the pilot. The engine is a Lorraine-Dietrich, with which the machine attains a speed of in the



THE HENRY POTEZ, TYPE VIII : This machine has a 50 h.p. Potez engine

neighbourhood of 200 kilometres (124 miles) per hour. The weight of the machine, all on, is 3,630 lbs. The overall length is 30 ft. 5 ins., and the span 46 ft. 2 ins.

landing. The landing speed is stated to be below 25 m.p.h., but, as in the case of the Farman sporting machine, this sounds a little optimistic, in view of the fact that the wing loading is about 4.5 lbs./sq. ft. Probably the landing speed is nearer 35 m.p.h. The undercarriage is provided with a sprag operated from the pilot's seat, by means of which the machine may be pulled up quickly after touching the ground.

Not the least interesting feature of this machine is its engine—a Henry Potez type A 4—of 50 h.p. It is placed vertically in the machine, with the cylinder heads pointing forward so as to ensure even cooling. (The engine is air-cooled.) At the upper end of the vertical crankshaft is a bevel gear which serves the double purpose of transmitting the power to the horizontal propeller-shaft and of giving a 2 to 1 gear reduction. The weight of the engine is somewhat great for its power, compared with modern aero engines, but it is stated by the makers that reliability has been their first consideration, and that they consider this of greater importance than low weight. The engine weighs 220 lbs., or slightly over 4 lbs./h.p., but it is claimed to be as reliable as a car engine, and to require very little attention. The bore is 100 mm. and the stroke 120 mm., and the full power of 50 h.p. is developed at a speed of 2,200 r.p.m., which give an airscrew speed of 1,100 r.p.m.

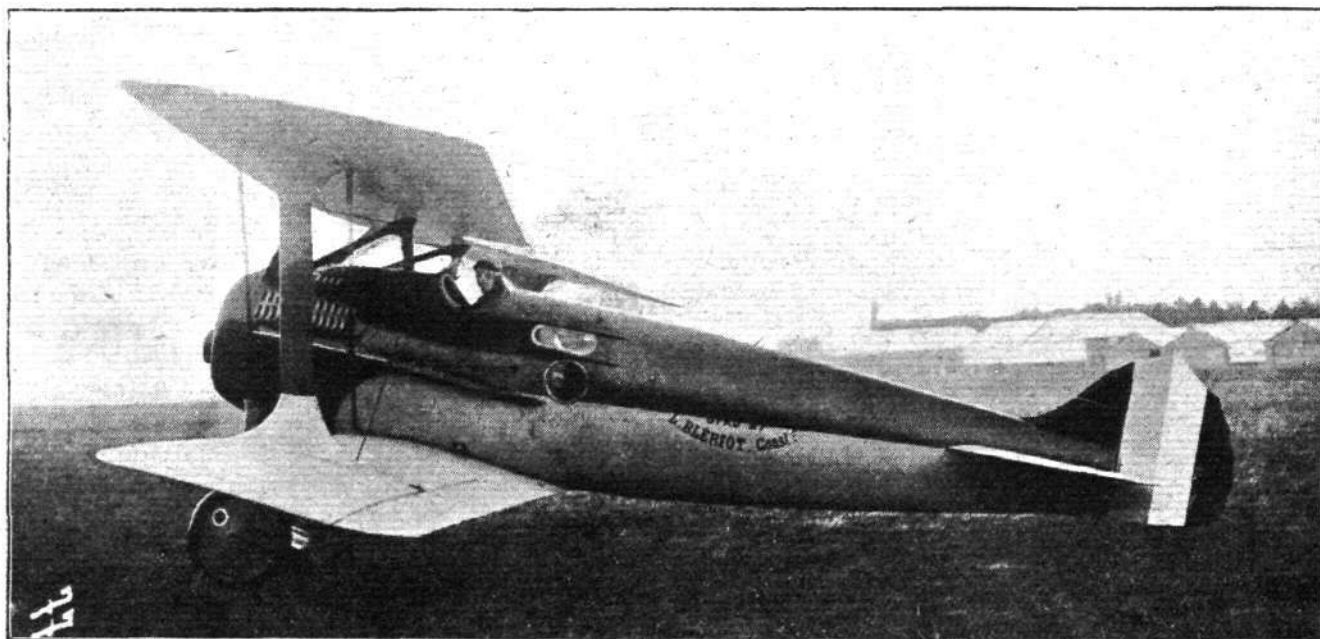


THE HENRY POTEZ, TYPE S.E.A. IV P.M. : Three-quarter front view

The sporting biplane is a small machine of 26 ft. 3 ins. span and 19 ft. overall length. It is designed as a two-seater, and is built to a large extent of Duralumin. Owing to the peculiar arrangement of the engine (see accompanying silhouette) the fuselage has been placed very low, giving a sturdy undercarriage structure which, with its four wheels, in conjunction with a low landing speed, practically precludes the possibility of damage except during an extremely bad

Blériot and Spad

The Blériot exhibit consists of one of the new four-engined passenger machines, with four Hispano-Suiza engines. As will be seen from our photograph, the engines are placed far apart, and one does not quite trust to the trim being maintained in case of an engine cutting out. Otherwise the machine is of very nice design, and its cabin will, no doubt, be greatly admired by visitors to the exhibition.



THE SPAD-HERBEMONT, TYPE S. 27, THREE-SEATER MONOCOQUE LIMOUSINE : It is fitted with a 300 h.p. Hispano-Suiza, and has a span of 32 ft., an overall length of 24 ft., and weighs, fully loaded, 2,772 lbs. It has a speed range of 65-143 m.p.h.

Three very interesting Spad machines are exhibited, interesting because, while retaining the characteristics of the Spads built during the War, they are, as regards two of them, designed for sporting purposes, having low-powered engines and consequently reasonable cost and upkeep. The third machine is a three-seater, with the two passengers seated inside an enclosed cabin.

The Spad *monocoque* type S 30 is small single-seater, with 45 h.p. Anzani engine. The wings are so arranged as to give the pilot a good view, and, while not very large, they are of sufficient area to ensure a low landing speed. The speed range is also very good, the maximum speed being in the neighbourhood of 87 m.p.h., and the landing speed about 37 m.p.h. The overall length is 19 ft. 6 ins., and the span 23 ft. 6 ins. The weight of the machine empty is 570 lbs., and in flying trim—with pilot and fuel for three hours—the weight is 880 lbs. The 45 h.p. Anzani engine is provided with a silencer which adds greatly to the comfort of the pilot. Strength has been especially studied, the machine having a factor of safety of 15.

The Spad *monocoque* type S 29 is a small two-seater, fitted with an 80 h.p. Le Rhone engine. The occupants are placed tandem fashion in the *monocoque fuselage*. The maximum speed is 102 m.p.h., and the landing speed just under 50 m.p.h. The length of the machine is 19 ft. 7 ins., and the span 25 ft. 5 ins. Empty the machine weighs 790 lbs., and fully loaded—with pilot and passenger and three hours' fuel—1,230 lbs.

The third Spad—the three-seater limousine—is a development of the military type S 20, and carries the series number S 27. Like the other two machines shown, it has the general Spad characteristics, although the enclosed body alters its appearance somewhat. The pilot is placed in front, while the two passengers are seated side by side inside the cabin, looking out on the country over which the machine is flying through windows in the sides of the *fuselage*. The engine fitted is a 300 h.p. Hispano-Suiza, which gives the machine a maximum speed of 143 m.p.h. The landing speed is about 65 m.p.h. The machine has an overall length of 24 ft., and a span of 32 ft. The weight of the Type S 27 is 1,870 lbs. empty and 2,770 lbs. fully loaded (pilot, two passengers and three hours' fuel).

G. Voisin

The ancient house of Voisin is not showing any new machines, as the contention of M. Gabriel Voisin is that the production of a new machine designed for peace-time flying is a matter of long and painstaking work and experimentation, requiring months or even years before an absolutely satisfactory machine can be created. The only full-size machine shown on this stand is, therefore, a War type—the Voisin X—which was in use at the time of signing the Armistice. It is a pusher fitted with a Renault engine, and provided with guns and bomb-gear. A scale model of the four-engined triplane of 1915 is also shown, as well as a small model of a patent Voisin hangar.

BRITISH ENGINES AT THE PARIS SHOW

The 40 h.p. Armstrong Siddeley

AN interesting aero engine of comparatively small power is to be seen in the two-cylindered Armstrong Siddeley fitted in the Bristol "Babe."

This engine, which has been designed for use in small single-seater machines, has two horizontally opposed cylinders, 5 in. bore by 5 in. stroke, the offset between their axes being 1½ ins. only. This is made possible by the use of extremely narrow roller bearing big ends to the connecting rods, with the result that the out-of-balance couple, present in all engines of this type in which the cylinders are not exactly opposed, is reduced to a very small amount. The valves are situated in the cylinder heads and are operated by push rods from a camshaft contained in the crankcase.

The construction of the cylinders is that of an aluminium alloy head into which is screwed a steel liner, thus forming the complete cylinder. This design is the outcome of a long series of experiments and as much as 30 h.p. per cylinder has been obtained and a m.e.p. of 127 lbs. per sq. in. has been reached with a petrol consumption less than .6 pints per brake horse-power hour.

The liner is screwed into the aluminium head under heat treatment thus allowing, when cool, for the aluminium alloy to shrink and make a satisfactory joint. The valve seatings

are of bronze and are expanded into the cylinder head, after which they are machined in position.

Each cylinder is fitted with two valves, manufactured from the very best quality steel, operated, as stated previously, by external push rods operating through horizontally placed rocker shafts. The cylinders are mounted by a special device on to an aluminium crankcase, which is constructed in one unit with a front cover through which the crankshaft protrudes to carry the propeller boss. The crankcase is neat in external appearance, and is mounted on to the front of the aeroplane by four bolts which are accessible from the outside.

The lubricating oil is contained in the base of the crankcase and is fed to the working parts of the engine by an oil pump. There is a special adjustment to allow the correct amount of oil being supplied from the pump so that at no time is more oil going to the working parts of the engine than is sufficient for the working.

The engine is provided with one ignition only, that is, a two-cylinder magneto of British manufacture. It is not considered necessary or desirable to fit a dual ignition to an engine of this nature, as was necessary on larger engines used during the War. The incoming gases pass through an exhaust-heated jacket mounted on the underside of the crankcase. Roller or ball bearings are used throughout the engine.

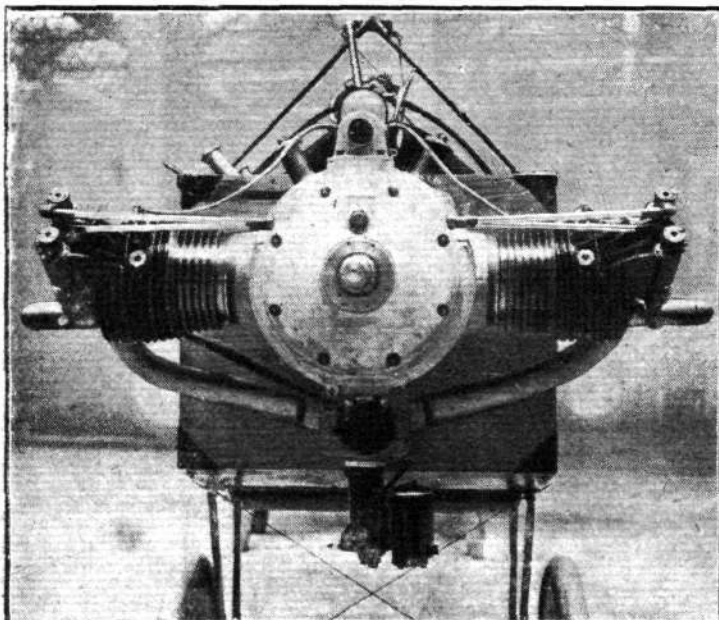
The Cosmos Engineering Co., Ltd.

Two types of engines manufactured by the above firm are to be seen at the Show, the 100 h.p. "Lucifer" fitted to the Boulton and Paul P.10, and the 450 h.p. "Jupiter," fitted to the Bristol "Bullet."

The "Lucifer" engine has been specially designed to meet the requirements of the small-powered, reasonably-priced, aeroplane power unit, reliability and long life, and low cost and ease of production being primarily aimed at. With these ends in view, the three-cylindered inverted "Y" type radial engine has been adopted. No attempt has been made to cut weight or obtain maximum performance, and although it is rated at 80 h.p., the makers guarantee 100 h.p. at 1,600 r.p.m. with a moderate m.e.p.

The three cylinders, which have a bore and stroke of 5¼ ins. by 6¼ ins. respectively, are air cooled, and form a combination of aluminium and steel construction embodying the firm's patent aluminium head. Overhead valves are employed, operated by push rods arranged on the front side of the cylinders, and an extremely simple plain reducing gear is used to run at half engine speed. The crankcase is a simple circular aluminium casting, the attachment to the *fuselage* being by means of a circular flange situated at the back of the case. The air screw runs at engine speed (1,600 r.p.m.), the propeller shaft being integral with the crankshaft. The propeller hub is the standard Air Board design, and is attached to the shaft by means of serrations and taper.

The pistons are of the modified slipper type, with three rings at the top and a scraper ring at the bottom.



The 40 h.p. Armstrong-Siddeley two-cylindered opposed aero engine

The crankshaft is a one-piece solid forging, and the connecting rods are of H-section. The big end and bearings are white metal lined, being run direct in to the big end of the rod.

Dual ignition is provided, the generator and distributors being suitably driven off the back end of the engine; the distributors placed in an accessible position.

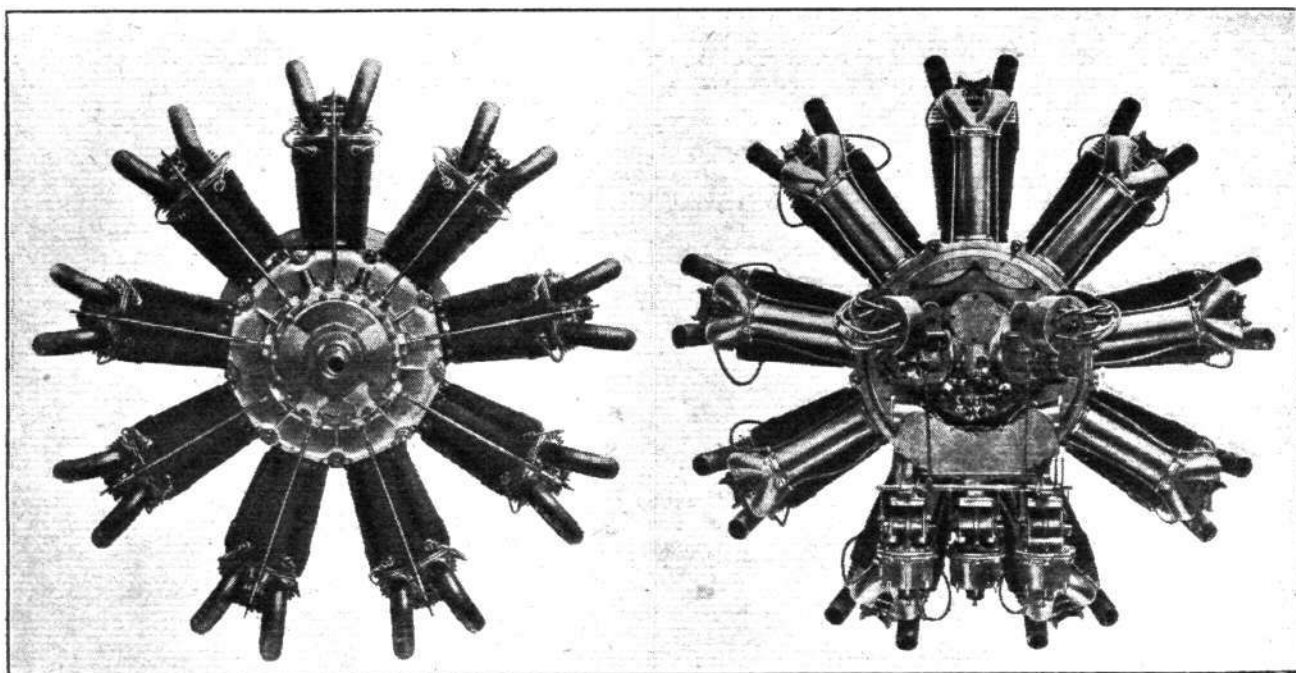
Two oil pumps are provided, one scavenging and one suction, oil being fed, under pressure, to the crank-shaft.

The filters are so arranged that they can be withdrawn for cleaning purposes from the front end of the engine; an adjustable oil relief valve is provided.

A circular induction system is fitted to the three cylinders, the branch pipe from the carburettor to the circular induc-

tion ring being provided with an exhaust heater. A starting handle, which may be operated from the pilot's cockpit, is provided.

Several improvements have been made to this engine in the meanwhile, and its performance is now considerably improved. The "Jupiter" is a nine-cylindrical air-cooled engine, with the cylinders arranged radially in a single row. It is made in two types—ungeared, and with an epicyclic reduction gear. In the former model the normal horse-power is 400 at 1,650 r.p.m., the maximum horse-power being 450 at 1,850 r.p.m. With the reduction gear the horse-power is 450 at 1,850 engine speed and 1,200 propeller speed. The bore and stroke of the cylinders are $5\frac{1}{4}$ ins. by $7\frac{1}{2}$ ins. respectively. The maximum diameter of the engine is $52\frac{1}{2}$ ins.,



THE 500 H.P. COSMOS "JUPITER" AERO ENGINE: Front and rear views

tion ring being provided with an exhaust heater. A starting handle, which may be operated from the pilot's cockpit, is provided.

The total weight of the engine, all on, is 280 lbs.—2.8 lbs. per horse-power.

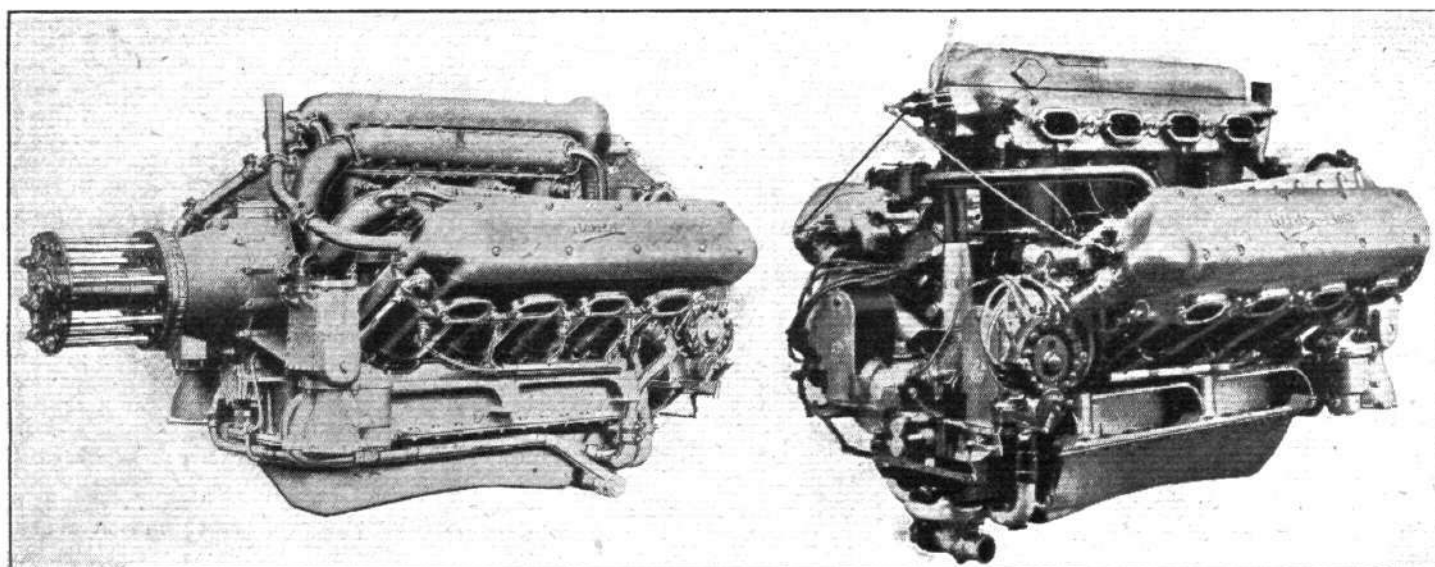
The designs for the "Jupiter" engine were accepted by the British Government in July, 1918, and the first experimental engine was completed before the end of October the same year. It was fitted to a Bristol "Badger" and gave excellent results on test, as the following figures will show. The total weight of the machine, "all on," was 2,800 lbs., the revolutions per minute on ground were 1,550 and when climbing at 80 m.p.h. and flying level at 7,000 ft. at 125 m.p.h.,

and the total weight, including carburettors, magnetos, etc., is 636 lbs. (ungeared) and 757 lbs. (geared).

One of the special features of this engine is its accessibility. Reference to the accompanying illustration showing the rear view illustrates the ease with which such units as magneto, carburettor, oil pump, oil relief valve and starter may be dismantled.

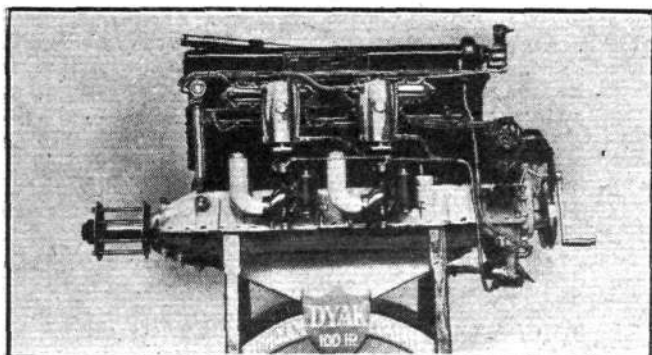
Napier

The famous 450 h.p. Napier "Lion" is to be seen fitted to the machines exhibited on the Airco and Handley Page stands, and representatives of the company will be in attendance at the Show. The Napier "Lion" which, in conjunction with the Airco 9R biplane, recently put up 18 British records



THE 450 H.P. NAPIER "LION" AERO ENGINE: Two views showing the front and rear ends

for speed, is a twelve-cylindrical water-cooled engine, with the cylinders arranged, "broad-arrow" fashion in three blocks of four—one vertical and two at 60°. The cylinders, which have a bore and stroke of $5\frac{1}{2}$ ins. by $5\frac{1}{2}$ ins. respectively, are steel forgings machined all over, with steel water jackets and detachable aluminium cylinder heads containing inlet and exhaust passages, valves and valve actuating mechanism. The pistons are of aluminium alloy fitted with two gas and two scraper rings. There are two inlet and two exhaust



The 100 h.p. six-cylindrical Sunbeam "Dyak" aero engine

valves to each cylinder, fitted with coil springs and operated direct by two overhead camshafts, driven through bevel gearing by vertical shafts from the crankshaft. The whole of the valve mechanism is enclosed within a detachable oil-tight aluminium case.

The connecting rods are machined from special high-grade steel, the master rod, which is coupled to the pistons of the vertical block of cylinders, is formed with lugs on either side to which are attached the short auxiliary rods for the

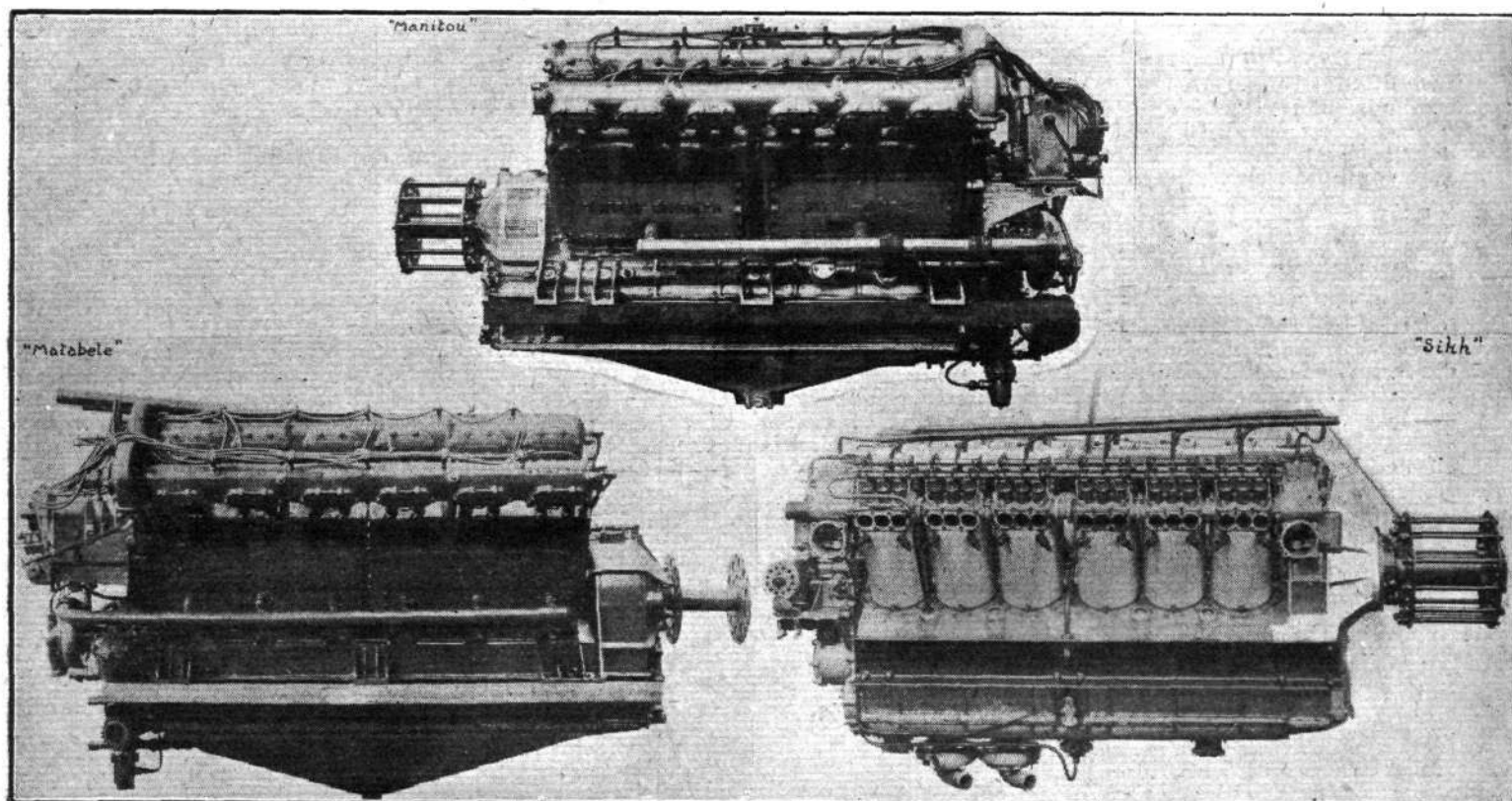
spur gears. The crankcase is of aluminium, suitably stiffened, and the front end encloses the reduction gear for the propeller shaft, which can be easily withdrawn. Oil and water pumps, and drive for the camshaft, magnetos, and pumps, are located in a case bolted at the rear. The water pump is of the centrifugal type running at half crankshaft speed, and water is delivered through a separate outlet to each of the three cylinder blocks. There are three oil pumps, two suction and one pressure type, driven at half crankshaft speed. The suction pumps are connected to the sump, and the pressure pump draws oil, through a filter, from the supply tank.

Lubrication is by pressure throughout to big ends, gudgeon pins, camshaft bearings and the forward bearing of crankshaft. The reduction gears are lubricated by oil squirted on to the teeth from a pipe connected to the crankshaft lubricating system. Valve tappets and cams are lubricated by the oil that escapes from the camshaft bearings. All oil which drains into the sump is delivered to the supply tank by the suction pumps. An adjustable pressure relief valve, and a pressure gauge are incorporated in the system.

Two twelve-cylindrical ignition magnetos are fitted, giving two sparks in each cylinder, and special distributor rotors are provided to facilitate starting by hand. One twin and one single carburettor, Napier system, are fitted. These are water-jacketed, as are the steel induction pipes. Altitude control cocks are fitted, and an arrangement is provided whereby an equal distribution of the gas to the three cylinder blocks is secured.

The Napier patent air-petrol starter is fitted, by means of which an explosive mixture is pumped into the cylinders, and ignited by means of a hand-starting magneto, operated through the special distributor rotors of the main magnetos previously mentioned.

The weight of the engine dry, complete with propeller boss, carburettors, induction pipes, etc., is 850 lbs., and the gross weight in running order, with fuel for six hours, but without water, is 2,671 lbs., giving a weight per horse-power of 1.89 lbs. The overall length, to centre of propeller, is 4 ft. 8 ins., and the overall width and height, 3 ft. 6 ins. and 3 ft. respectively.



A TRIO OF SUNBEAM AERO ENGINES: The 300 h.p. "Manitou," the 420 h.p. "Matabele," and the 800 h.p. "Sikh"—all twelve-cylindrical "V" type

pistons of the other blocks of cylinders. The big ends are white metal lined. The crankshaft is machined from a solid steel forging, all four throws being in one plane. All journal bearing and crank pins are of large diameter, and bored out. The crankshaft is carried on five large roller bearings and one large plain bearing at the forward end. The propeller shaft, which is carried on two roller bearings and fitted with a double-thrust ball bearing, is driven at a reduction ratio of 1 to 1.52 to crankshaft through wide high-grade alloy steel

The fuel consumption (full load) is .48 lbs. per b.h.p., and the oil consumption, .02 lbs. per b.h.p.

Sunbeam-Coatalen

The four engines to be exhibited by the Sunbeam Co. at the Paris Show have many similar characteristics, but differ in important details other than those of size and power. To take first of all those points in which the engines are similar will perhaps be the best plan. The four engines in question

bear the usual tribal names of Sunbeam-Coatalen aircraft engines and are of the following range of horse-power:—"Dyak," six-cylinder vertical, 100 h.p.; "Manitou," twelve-cylinder "V," 300 h.p.; "Matabele," 420 h.p.; "Sikh," 800 h.p.

All these engines are composed of similar materials for similar parts, with one exception which will be noted later. The crankshafts are of nickel chrome steel, the pistons being of aluminium. The valves are of high chrome steel, of a special form and designed to withstand heat and prevent distortion, and the valve gearing is of self-hardened nickel chrome steel. The cylinder blocks, with the exception of the "Sikh" engine, are of aluminium casting with very large water circulation spaces and inspection covers. The cylinders are fitted with steel liners and the valve seats are of bronze. In the case of the "Sikh" engine, however, the cylinders are composed of steel throughout, and are welded together with their jackets.

The crankcases are in each case of aluminium casting and are of a patent form, designed to give greater strength and to allow the bearing caps to take a large share of the side load imposed on the crankshaft under the usual working stresses. All these engines are of the water-cooled type, the circulation being in each case by centrifugal pump designed to give a specially large output. Lubrication in all types is by gear wheel pumps, three of these being employed: (a) A scavenger pump which draws the oil from the sump and returns it to the oil tank; (b) the main force pump which forces oil through the drilled crankshafts and ducts in the crankwebs to the main bearings, drawing direct from the oil tank; (c) the auxiliary oil circuit pump which forms a portion of the main force pump and is arranged to deliver the necessary quantity of oil at a very low pressure to the camshaft bearings and all auxiliary bearings.

Carburation is effected by Claudel Hobson carburettors of diffuser type working under a head or pressure of 4 lbs. per sq. in.

Ignition is by high tension magnetos, and particulars as to the number of these are given in the details of each engine. The magneto drive is by a coupling formed of laminated spring blades giving great flexibility and ensuring a long life for the magneto.

The "Dyak" "Manitou" and "Matabele" engines are each fitted with two sparking plugs per cylinder, the "Sikh" engine being fitted with four plugs per cylinder.

Having considered the general characteristics of all the engines, we may now pass to the details more particularly applying to the individual engines.

In the case of the "Dyak" 100 h.p. this engine is of the vertical type, the six cylinders being cast *en bloc* in aluminium, this casting being made in the Sunbeam Company's own foundry and being one of the largest, if not the largest, yet made in this material. There are two valves to each cylinder, operated by one overhead camshaft which is driven direct by bevel gearing to the crankshaft. This is carried on seven die-cast white-metal bearings, and drives the propeller directly; the thrust bearing being mounted on an extension of the crankcase. The carburettor is of the B.Z.S. 38 type, and is arranged for gravity feed. The starting of this engine is effected by hand. The chief dimensions are as follow:—

Bore	120 mm.
Stroke	130 mm.
Total stroke volume of cylinders	8,820.5 c.c.
Normal speed of engine	1,200 r.p.m.
Fuel consumption54 pint per b.h.p. hour.
Weight of engine "dry"	399 lbs.

The "Manitou" 300 h.p. is a twelve-cylindere engine,

the cylinders being cast in blocks of three and disposed on the crankcase in two rows of six each, the angle of inclination being 60°. There are two inlet and two exhaust valves actuated by overhead camshafts, these being driven by trains of gears from the crankshaft. The connecting rods are of the usual "H" section and of the articulated pattern. The hollow crankshaft is carried on eight die-cast white-metal bearings, and the propeller is driven indirectly by gearing to the propeller shaft which, with the thrust bearing, is mounted on an extension of the crankcase cast on the engine.

Carburation is by two Claudel Hobson H.C. 7 carburettors arranged for gravity feed and set in the centre of the "Vee." The magnetos employed are two of the B.T.H. A.V.12 type, and these are driven from the trains of gears at one and a half times engine speed. Both electric and hand starters are fitted to this engine. The chief dimensions are as follow:—

Bore	110 mm.
Stroke	135 mm.
Total stroke volume	15,395 c.c.
Normal speed of engine	2,000 r.p.m.
Fuel consumption54 pint per b.h.p. hour.
Ratio of reduction	1.57 to 1.
Weight of engine "dry"	845 lbs.

The "Matabele" 400 h.p. engine is similar to the "Manitou" with regard to the general layout, the cylinders being similarly cast and disposed on the crankcase. The valves are likewise four in number (two inlet and two exhaust) and the valve gearing is exactly similar to that of the above-mentioned engine.

The propeller drive is likewise indirect, the gear reduction ratio being in this case 1.63 to 1. Carburation is by means of two Claudel Hobson H.C. 7 (twin type) carburettors arranged for gravity feed, and ignition is effected by means of four P.M. magnetos driven from the trains of gears. In this engine the starting is either by compressed air or by the hand starter. The chief dimensions are as follow:—

Bore	122 mm.
Stroke	160 mm.
Total stroke volume	22,429 cc.
Normal revolutions	2,000 r.p.m.
Fuel consumption54 pint per b.h.p. hour.
Weight of engine "dry"	1,000 lbs.

The "Sikh" engine as mentioned before, considerably differs from the other three. It has twelve separate steel cylinders machined all over, and welded together with their jackets, the disposition on the crankcase being the same as in the smaller twelve-cylindere type. There are three inlet and three exhaust valves to each cylinder, the method of valve gearing being by push rods and rockers actuated by a single central camshaft driven as usual from the trains of gears. Eight die-cast white-metal bearings carry the hollow crankshaft, and the propeller shaft is driven indirectly by spur gear, the thrust being mounted on an extension of the crankcase cast on the engine.

Carburation is effected by means of four Sunbeam Claudel carburettors of special form, two being situated at each end of the engine. Ignition is by four twelve-cylindere magnetos driven by skew gear and fitted with Vernier type coupling to allow of fine adjustment. Both hand and electric starters are fitted to this engine. The chief dimensions are as follows:—

Bore	180 mm.
Stroke	210 mm.
Total stroke volume	64,113.6 c.c.
Normal speed of engine	1,400 r.p.m.
Fuel consumption51 pint per b.h.p. hour.
Ratio of reduction	1.526 to 1.
Weight of engine "dry"	1,952 lbs.

Knighthoods for Australian Flyers

JUST as we go to Press we learn from the Air Ministry that H.M. the King has conferred the honour of Knighthood of the Order of the British Empire (Civil Division), upon Capt. Ross Smith, M.C., D.F.C., A.F.C., and his brother, Lieut. Keith Macpherson Smith, late R.A.F., in recognition of the valuable services rendered to aviation by their successful flight in the Vickers-Vimy-Rolls from England to Australia. The King has also approved of the award of a bar to their Air Force Medals to the two mechanics Sergt. W. H. Shiers, A.F.M., and Sergt. J. M. Bennett, A.F.M.

General Seely's Successor

MAJOR G. C. TRYON, M.P., has been appointed Under-Secretary for Air in succession to Major-General the Right Hon. J. E. B. Seely, C.B., D.S.O., M.P., resigned.

Air Mail Service to Paris

THE Postmaster-General announces that no air mail will be despatched from London to Paris on December 25, 26 and 27.

A Handley-Page at Warsaw

THE Handley Page which Capt. E. D. C. Herne and Capt. Davis flew from London, safely reached Warsaw on December 20.

The Caterham Fatality

AT the inquest on Lieut. S. B. Bradley, the pilot of the machine which crashed at Caterham, the opinion was expressed that he was flying along the base of a cloud which pinched him lower and lower until he struck the tree on the top of a hill while trying to reach Kenley aerodrome. A verdict of accidental death was returned.

SOME POST-WAR SOPWITH MACHINES

THE Sopwith Aviation and Engineering Co. is by no means disposed to rest upon its laurels, and testimony to this effect is furnished by the origination of the three new peace types: the "Dove," the "Gnu" and the "Transport." Further, the company's design and experimental department is being maintained at its full strength and is as busy as ever. Some interesting developments are likely to be heard of in the near future. With the single exception of lighter-than-air craft their experience as that of pioneer designer-constructors covers all types of aircraft, flying boats, sea planes and "land" machines. Furthermore they have built, and had standardised, everything from bombers and torpedo-carriers to high-speed scouts, and in every type they have attained eminence. No better proof of this could be asked than the

The construction of this machine is on normal lines.

It is of interest to note that the "Transport" is practically identical with the machine upon which the Atlantic flight was attempted last May, and is also very similar to the "Wallaby" upon which Capt. Matthews flew to Australia, which was described in FLIGHT for October 16 last.

It is fitted with an "Eagle 8" Rolls-Royce engine, and has a factor of safety of 6.5. An adjustable tail plane is fitted. The following are the principal characteristics of both the passenger and cargo types:—

Span, 46 ft. 6 ins.; chord, 6 ft. 3 ins.; stagger, 3 ins.; dihedral, $2\frac{1}{2}^{\circ}$; overall length, 28 ft.; height, 12 ft.; area of main planes, 547 sq. ft.; weight of machine fully loaded, 5,500 lbs.; speed, 115 m.p.h.



The Sopwith "Gnu" three-seater limousine, 200 h.p. B.A. 2

way in which their type names have become household words.

The "Transport" can be adapted for use either as a cargo machine or for the purpose of conveying passengers. In the former case, accommodation is provided for one pilot and passenger with 1,500 lbs. of cargo, and in the latter, arrangements are made for carrying five passengers and one pilot, four passengers being carried in the centre of the machine and one in the pilot's cock-pit behind the wings.

Petrol is carried for six hours at a cruising speed of 90 miles per hour in the case of the passenger carrier, and, when adapted for use as a cargo machine, fuel is provided for 8 hours at a cruising speed of 90 miles per hour.

The "Gnu" is a light high-performance three-seater passenger or goods machine of the single-engined tractor type, having an enclosed cabin for the passengers or goods at the rear of the main planes. There are two models of the "Gnu," but these differ only as regards the engine fitted, and, consequently, in the performance. In one model a 110 h.p. Le Rhone is fitted, and in the other a 200-h.p. Bentley rotary, the latter giving an extra 17 m.p.h. in the speed and a slight increase in range and climb. The general construction conforms with usual practice and the factor of safety is 6. The following characteristics apply to both models. Span, 38 ft.; chord, 5 ft.; gap, 5 ft.; stagger, 11 ins.; dihedral, $2\frac{1}{2}^{\circ}$; overall length, 25 ft. 6 ins.; height, 10 ft.;



The Sopwith "Dove" sporting two-seater, 80 h.p. Le Rhone



THE SOPWITH "TRANSPORT" PASSENGER OR GOODS MACHINE, 375 h.p. ROLLS-ROYCE : This machine is similar to the "Atlantic" and Australian ("Wallaby") machines

area of main planes, 350 sq. ft.; weight fully loaded, 2,160 lbs. (Le Rhone), 2,400 lbs. (Bentley); maximum safe load 1,202 lbs. (Le Rhone), 820 lbs. (Bentley); loading per sq. ft. 6.1 lbs. (Le Rhone), 6.85 lbs. (Bentley); speed range, 53-93 m.p.h. (Le Rhone), 65-110 m.p.h. (Bentley); climb,

stagger, 1 ft. 4 ins.; dihedral, 3°; overall length, 19 ft. 6 ins.; height, 9 ft. 6 ins.; area of main planes, 213 sq. ft.; weight fully loaded, 1,430 lbs.; maximum safe load, 665 lbs.; loading per sq. ft., 6.7 lbs.; speed range, 60-100 m.p.h.; climb, 5,000 ft. in 7½ mins.; range, 200-250 miles.



The Sopwith
 "Schneider Cup"
 racing seaplane,
 450 h.p. Cosmos
 "Jupiter"

5,000 ft. in 7½ mins. (Le Rhone), 5,000 ft. in 5½ mins. (Bentley); range, 220-300 miles (Le Rhone), 200-250 miles (Bentley).

The "Dove" is a sporting two-seater machine fitted with a Le Rhone 80 h.p. somewhat on the lines of the famous "Camel," etc., fighters. Its chief characteristics are as follows:—Span, 25 ft.; chord, 5 ft. 1½ ins.; gap, 4 ft. 6 ins.;

The "Schneider Cup" seaplane was described in *FLIGHT* for September 4 last, so that a further description is unnecessary here, and the following brief characteristics should suffice. Span, 24 ft.; chord, 5 ft. 1½ ins.; gap, 4 ft. 6 ins.; stagger (back), 2½ ins.; overall length, 22 ft.; weight, 2,200 lbs.; speed (as land machine), 170-175 m.p.h. The engine is a 450 h.p. Cosmos "Mercury."

Australia-Tasmania Air Mail

AN air mail between Melbourne and Tasmania was started on December 15, when Lieut. Long flew an Alliance machine across the Bass Straits from Hobart. A Sopwith also flew in the reverse direction from Melbourne.

Brazil and Aviation

Two Brazilian aviators, Alzir Rodrigues and Bento Ribeiro, have been selected by the Government to proceed to England and the United States to visit aviation works.

Thirty aeroplanes have been bought for the Brazilian Army, in France.

Air Transport in Czecho-Slovakia

A MESSAGE from Prague states that an agreement has been concluded between the authorities in the Czecho-

Slovakia capital and the Aircor concern for the establishment of air transport lines having Prague as their centre.

An Italian Government Competition

WORD comes from Rome that the Italian Government proposes to organise a competition for prizes aggregating 2,000,000 lire (£79,000 at pre-War value) for aeroplanes intended for post and commercial work.

Zeppelin Raid Memorial Church

It is proposed to build a Memorial and Thanksgiving Church at Billericay, Essex, where, in the Zeppelin raid on September 23, 1916, one of the enemy machines was brought down by Maj. F. Sowrey, D.S.O. The present church is inadequate, and there is no vicarage. A site has been presented and a fund started, contributions to which may be sent to Messrs. Barclay and Co., Billericay, Essex.

SOME GOSPORT FLYING BOATS FOR 1920

THE flying boat programme of the Gosport Aircraft Co. for the year 1920 was arranged in conjunction with the late Col. J. C. Porte, C.M.G., who joined the staff early in August, 1919. Several new designs were produced, and the types which had proved so successful during the late War were considerably improved and modified to suit commercial requirements.

In this way four types were involved, consisting of a large, a medium, and two smaller flying boats.

It is unnecessary to describe in detail each type, as the general features are similar in all models. It is proposed, therefore, to describe briefly the medium-sized flying boat known as the "G. 5," and then to indicate any particular features or departures in the other types.

G 5.

This flying boat was designed to fulfil the requirements of two quite distinct specifications in which moderately high speed was common to both. Owing to the roomy hull it will be realised that the same boat may be used for a variety of purposes provided the same aerodynamic qualities are retained throughout. Such being the case this flying boat was designed either as a carrier of passengers, mail and cargo,

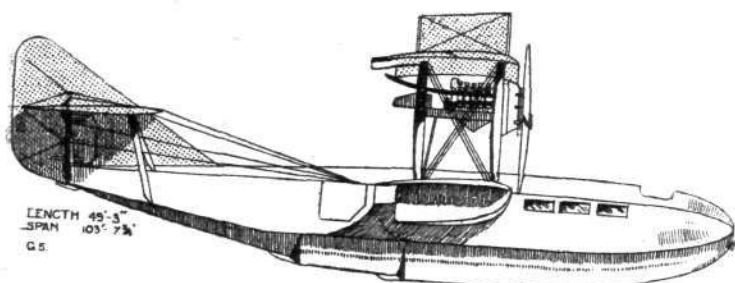
The tail unit may either be of monoplane or biplane type if the latter, the elevators on the top plane are operated by the control column in the usual way, while the lower elevators, which are not connected to the upper ones, are operated by a lever on a quadrant situated at the side of the pilot and parallel to the control column. This arrangement has been found to be very satisfactory, the lower elevators being used for trimming in the same manner as an adjustable tail.

All flight controls, which are of the usual type, are balanced, with the exception of elevators. The use of serve motors has been found unnecessary.

The engines are mounted on spruce bearers capped with ash, which in turn are supported by V-struts between top and bottom plane spars.

The radiators are situated in front of engines and supported by the same bearers. They are fitted with shutters and thermometers, both connected up to the engineer's cockpit.

Inside the hull is carried a reserve water tank of 10 gallons capacity, from which make up water is circulated to each radiator separately by means of a small hand rotary pump. The overflow from the radiators is led by a pipe therefrom to an open funnel leading to the above tank. This renders

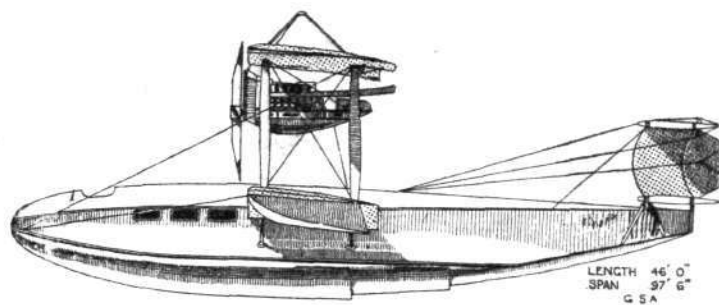


The Gosport G 5 flying-boat, for passenger or goods

or either alone, or alternately as a machine to operate in Canada or in United States of America for the purpose of locating forest fires and carrying personnel and fire-fighting appliances to the conflagration in the shortest possible time.

The utility of a flying boat in a country which is densely wooded but where there are numerous lakes and fairly broad rivers is easily understood.

From one of the accompanying sketches it will be seen that the G 5 or G 5A is a twin-engined biplane, generally fitted with two 365 h.p. Rolls-Royce "Eagle VIII" engines, but

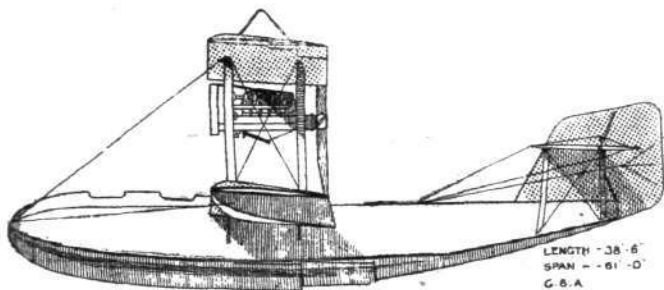


The Gosport G 5a, which is a slightly smaller modification of the G 5

the amount of overflow clearly visible to the engineer. A 10-gallon oil tank is fitted behind each engine.

The petrol system is positive feed from main tanks by means of two centrifugal pumps to gravity tank situated in the top plane, thence by gravity to engines. In the event of failure of this system, petrol may be fed direct to engines from main tanks.

A hand pump of the semi-rotary type is fitted as a standby. The tanks are filled from a connection on the outside of the boat, thus keeping hull free from petrol.



The Gosport G 8a type flying-boat, of which the G 8 is a slightly larger model

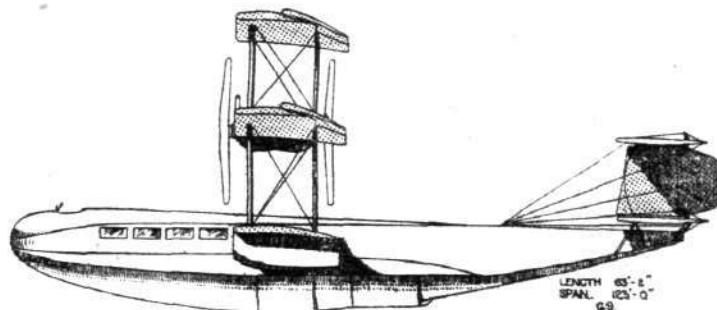
either 450 h.p. Napier "Lion" or 500 h.p. Cosmos "Jupiter" may be fitted.

The top plane, which is of larger span than the lower plane, is built up in five parts—a centre section, inner planes, and extensions.

The lower plane consists of two portions—a port and a starboard plane, attached to the hull at the wing roots. To the lower plane are fixed the wing tip floats, which are of boat type construction, double diagonal planking on the bottom and Saunders' consuta plywood on sides.

The whole wing structure is secured to the hull transverse bracing unit, which is continuous from port to starboard and integral with the main fore and aft hull structure. This is a feature of all these type hulls, and possesses great advantages over any other type so far built.

In one model the wing sections immediately above the engines are removable without disturbing the main structure, thus greatly facilitating removal of the engines for overhauling, etc.



The Gosport G 9 triplane flying-boat. Fitted with three engines, it is intended for long-distance cargo work

The pumps, which are situated about 2 ft. from bottom of tanks, are driven by a wind propeller through two sets of bevel gearing, thus doing away with a large suction head on the pump and so minimising risk of air leakage into the suction side of the system. A pipe leads from the bottom of each tank to a combined pump and distributor box, thence through non-return valves to the pumps via filters.

The hull, which is of the latest "Porte" type construction, forms perhaps the most important feature of these flying-boats. Before describing in detail the construction, it may not be out of place to say a few words about them generally.

They were evolved as the result of extensive full-scale experiments carried out during the past five years. As a proof of their sea and air-worthiness it may be remarked that during a period of eighteen months' operation of these boats from one seaplane station, a total of 198,600 sea-miles were flown without loss of one life. It may be described

as rigid compared with the usual more or less flexible construction which follows high-speed motor boat lines.

The sides are formed by two braced girders running from bow to stern, similar to the ordinary braced fuselage. The top is also braced in the same way, and is covered with fabric laid on formers to give a good streamline form. A deep built-up keelson and a continuous keel run from bow to stern in the usual manner. Built-up floors connect up the keel to the two bottom longerons.

Timbers spaced about 9 in. apart run without a break from top longeron on one side, over keel to top longeron on the other side. The planking, which is double diagonal, runs from keel to top longeron on either side and is continuous round the fin chine, thus eliminating two joints which are always troublesome to keep water-tight. The steps, two in number, are detachable without interfering with hull planking, and are supported on fore and aft ash bearers. At the wing roots there is a complete transverse bracing unit under each spar connecting up port and starboard lower planes.

Two great advantages result from this construction. Firstly, all flight loads are directly coupled up in one complete structure, thus ensuring the machine keeping in truth—this applies especially to the angle between tail plane and main planes. Secondly, the resultant weight of the complete boat passes through the keel, thus avoiding distortion and local stresses when on the trolley.

"G 8".

The "G 8" was produced to meet the demand for a small, handy, reliable flying-boat, in which high top speed was not essential. It has a very low landing and getting-off speed, and owing to the fairly large hull is dry and seaworthy.

It may be used for a variety of purposes, such as carrying small quantities of mails and cargo, and for police and patrol duties. It also makes an ideal training machine. It is a pusher biplane fitted with one 270 h.p. Rolls-Royce "Falcon" engine. The hull construction and lines are similar to the "G 5" already described. The superstructure calls for no particular comment, apart from the centre section.

As with the "G 5" the top centre plane is quickly removable without disturbing the main planes, thus rendering the engine very accessible.

The machine is of very robust construction, and has a factor of loading of six throughout.

"G 8A".

The "G 8A" with exception of superstructure and engine is identical to the "G 8". It was produced to fulfil the demand for a small, fast flying-boat.

It may be fitted with either a 360 h.p. Rolls-Royce "Eagle 8" engine, or a Napier "Lion," or a Cosmos "Jupiter."

"G 9".

This flying-boat was designed primarily to carry mails and valuable cargo long distances over the sea.

It is a triplane, and fitted with three 600 h.p. Rolls-Royce "Condor" engines, or two 1,000 h.p. Cosmos "Hercules" engines.

The general design is similar to the "G 5," and is designed to a factor of loading of four throughout.

Type.	Span.	Chord.	Gap.	Area main planes.	Weight full load.	Useful load.	Speed range.	Crew.	Pass.
	ft. in.	ft. in.	ft. in.	sq. ft.	lbs.	lbs.	knots		
G 5 ..	103 0	8 0	8 6	1,410	12,500	4,980	45-87	2	6
G 5A	97 6	9 0	8 6	1,440	12,500	5,030	45-88	2	6
	65 0								
G 8 ..	79 0	7 3	8 6	910	4,850	1,390	36-74	1	3
	51 0								
G 8A	61 0	7 3	8 6	700	5,250	1,650	45-87	1	3
	40 0								
G 9 ..	113 0	10 0	8 6	1,380	28,800	9,340	45-95	3	10

HONOURS

It was announced in a supplement to the *London Gazette*, on December 16, that the King has been pleased to approve of recognition being accorded, as indicated below, to Officers and other ranks of the Royal Air Force, for gallantry while Prisoners of War in escaping, or attempting to escape, from captivity, or for valuable services rendered in the Prison Camps of the Enemy:—

Bar to the D.S.O.

Wing-Com. E. F. Briggs, D.S.O., O.B.E.; Wing-Com. C. E. H. Rathborne, D.S.O.

Mentions.

The following have been mentioned in reports for valuable services while in captivity, and noted accordingly in the Official Records of the Air Ministry:—

Lieut. A. T. Adams (Wilts. R.); Flying-Offr. G. C. Atkins; Lieut. A. N. Barlow; Flying-Offr. C. B. Bird, M.C.; Lieut. N. A. Birks; Lieut. C. W. Blain, A.F.C. (deceased); Capt. G. K. Blandy; Flight-Lieut. B. J. W. Brady, D.S.M.; Lieut. Sir A. W. Brown, K.B.E. (Manc. R.); Flying-Offr. R. S. Capon (Lpool R.); Flying-Offr. G. L. Carter; Lieut. H. K. Cassels; Flying-Offr. A. C. Collier; Flight-Lieut. E. J. Cooper, D.S.C.; Lieut. A. H. M. Copeland; Lieut. H. Cotton (Quebec R.); Lieut. A. Couston (Aus. F.C.); Sec. Lieut. V. Dougall (Can. Flying Corps); Lieut. A. T. Eason; Pilot Offr. H. Edwards; Lieut. W. B. Ellis (A.S.C., T.F.); Wing-Com. P. F. M. Fellowes, D.S.O.; Flying-Offr. J. J. Fitzgerald (R. Innis. Fus.); Lieut. R. J. Fitzgerald (12th Glouc. R.) (deceased); Capt. G. C. Formilli (R.G.A.); Lieut. C. E. French (6th Can.); Flying-Offr. E. J. Fulton (Ind. Army); Lieut. E. P. Fulton; Flying-Offr. E. H. Garland (N.Z.F.C.); Sec. Lieut. A. C. Geen; Lieut. R. S. Gilbert; Sqn. Ldr. (A./W.C.) R. Grey, D.S.O. (Gren. Gds.); Lieut. D. Grinnell-Milne (R. Fus.); Flight-Lieut. J. O. Groves; Capt. W. L. Haight (R.F.A.); Lieut. H. D. Hamilton (N.Z.F.C.); Lieut. P. F. Heppell (R.A., T.F.); Flying-Offr. H. E. Hervey, M.C.; Lieut. A. B. Hill; Capt. T. G. Holley (13th Can. R.); Flying-Offr. F. N. Hudson, M.C. (E. Kent); Lieut. E. P. Hyde (6th Ches. R.); Flying-Offr. H. Ibbotson; Lieut. W. C. Jameson (R.N.V.R.) (deceased); Lieut. M. M. Kaye; Flying Offr. H. Kirby; Flying-Offr. F. R. Knapp; Flying-Offr. W. E. Knowlden (Bord. R.); Flight-Lieut. C. Laurence; Capt. D. Leeson (7th Can. R.); Flight-Lieut. J. M. D'A. Levy; Lieut. V. O. Lonsdale (R.F.A.); Lieut. H. O. Macdonald; Flight-Lieut. L. D. McKean; Lieut. R. R. Macintosh; Lieut. G. D. McLeod; Flight-Lieut. T. G. Mapplebeck (Lpool R.); Capt. F. W. Mardock; Flying-Offr. M. J. J. G. Mare-Montebault, M.C. (Yeo.); Lieut. L. Marsh; Sec. Lieut. N. H. Marshall; Lieut. H. W. Medlicott (deceased); Lieut. H. B. O. Mitchell, M.C. (R. Innis. Fus.); Lieut. L. A. Newbold (Essex R.); Maj. R. W. Nichol; Flying-Offr. L. G. Nixon; Capt. J. C. F. Owen, M.C. (Can. A.S.C.); Lieut. J. K. Parker (R. Sco. Fus.); Lieut. (A./Capt.) R. O. Purry; Capt. Sir R. J. Paul, Bt. (Egyptian C.S.); Flying-Offr. L. J. Pearson (R.E.); Flight-Lieut. S. L. Pettit (R. Fus.); Flying-Offr. A. W. Phillips; Capt. K. Rawson-Shaw (R.F.A.); Flying-Offr. C. Reece (4/Ches. R.); Flying-Offr. W. A. Reeves (E. Surr. R.); Flight-Lieut. G. H. Reid, D.F.C.; Flying-Offr. A. R. M. Rickards; Lieut. J. G. Robertson (Can. M.R.); Flying-Offr. J. B. Robinson; Capt. W. L. Robinson, V.C. (Worc.) (deceased); Lieut. N. C. Seward (R.A., T.F.); Lieut. A. T. K. Shipwright; Lieut. W. C. Short; Sec. Lieut. A. S. Sinclair; Flying-Offr. A. H. Skinner; Lieut. S. Smith, D.C.M.; Lieut. C. Smythe, M.C. (Can. Fd. Art.); Flying-Offr. (Hon. Flight-Lieut.) E. J. Strover (3rd Brehmans); Lieut. W. Taylor (R.F.A.); Lieut. C. D. Thompson (Hon. A. Co.); Capt. R. J. Tipton (3/W.L. Bde., R.F.A.) (deceased); Flight-Lieut. H. C. Vereker;

Lieut. (Hon. Capt.) E. G. S. Walker; Flying-Offr. A. A. Ward (R.A.); Flying-Offr. R. Watts; Flying-Offr. (Hon. Flight-Lieut.) T. R. Wells, M.C. (33rd Punjabis); Capt. T. W. White, D.F.C. (Aus. F.C.); Sec. Lieut. B. O. Wilkin (D.C.L.I.); Lieut. W. O. B. Winkler (R.G.A.); Lieut. D. B. Woolley; Capt. F. C. C. Yeats-Brown, D.F.C. (Ind. A.).

No. 200449 Sergt.-Obsr. H. Brooks; No. 46448 Actg.-Corp. O. W. A. Grant; No. 208940 Air-Mech. W. W. Higby; No. 201866 Ldg.-Mech. D. Kennedy; No. 207252 Sergt. E. E. Smith.

Foreign Decorations.

The King has granted unrestricted permission for the wearing of the under-mentioned decorations, conferred upon the Officers and other ranks indicated for valuable services rendered in connection with the War:—

CONFERRED BY THE PRESIDENT OF THE UNITED STATES.

Distinguished Service Medal.

Air Vice-Marshal Sir G. M. Paine, K.C.B., M.V.O.; Air-Commodore A. V. Vyvyan, C.B., D.S.O.; Air-Commodore C. L. Lambie, C.B., C.M.G. D.S.O.; Air-Commodore R. M. Groves, C.B., D.S.O., A.C.F.; Group-Capt. (A./Air-Commodore) E. M. Maitland, C.M.G., D.S.O., A.F.C.; Lieut.-Col. J. C. Porte, C.M.G. (deceased); Maj. G. C. Neilson.

Navy Cross.

Maj. W. C. Grant.

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC.

Croix de Guerre, with Bronze Star.

Flight-Lieut. R. Whitaker, M.B.E. (Rfl. Bde.).

Croix de Guerre, with Palme.

Flying-Offr. C. R. Keary, late 43rd Sqdn.; Obsr.-Offr. E. B. C. Betts, D.S.C., D.F.C.

CONFERRED BY THE KING OF ITALY.

Cavalier, Order of the Crown.

Capt. E. Newman (formerly R.A.O.C.).

Bronze Medal for Military Valour.

No. 3203 Sergt. G. A. Prowse, 17th Sqdn.

CONFERRED BY THE KING OF THE HELLENES.

Greek Medal of Military Merit, 2nd Class (with Silver Palm).

Wing-Com. C. R. J. Randall, C.B.E.

Greek Military Cross, Class 3.

Mar. W. S. Scott, M.C., A.F.C.

CONFERRED BY THE SULTAN OF EGYPT.

The Order of the Nile, 4th Class.

Pilot-Offr. W. Pightling.

Corrections.

Actg. Matron-in-Chief Miss J. M. Cruickshank, R.A.F. Nursing Service (formerly attd. Q.A.M.N.S.I.), awarded the Royal Red Cross, 1st Class, in *Gazette* of October 10, 1919, is now correctly described.

Flying-Offr. C. A. Bouchier, D.F.C., awarded the Distinguished Flying Cross in *Gazette* of November 18, 1919, is now correctly described.

No. 214290 Signalman W. H. C. Hazlewood, A.F.M. (subsequently Cadet No. 181167), awarded the Air Force Medal in *Gazette* of September 21, 1918, is now correctly described.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND COMMITTEE.

A MEETING of the Flying Services Fund Committee was held on Monday, December 15, 1919, when there were present:—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., in the Chair, Mr. Chester Fox, Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., and the Secretary.

Applications for Assistance.—Twenty-seven applications for assistance were considered, and Grants and Allowances were voted amounting to £290.

HOUSE COMMITTEE.

A Meeting of the House Committee was held on Tuesday, December 16, 1919, when there were present:—Mr. Ernest C. Bucknall, in the Chair, Mr. Henry Knox, Mr. J. Stewart Mallam and the Secretary.

SPECIAL COMMITTEE MEETING.

A Special Meeting of the Committee was held on Wednesday, December 17, 1919, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. Spenser, D. A. Grey, D.S.O., Squadron-Leader T. O'B. Hubbard, M.C., R.A.F., Lieut.-Col. Mervyn O'Gorman, C.B., Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and the Secretary.

Election of Members.—The following New Members were elected:—

Percy Arthur Brooksbank.
Flight-Lieut. Leonard Herbert Cockey, R.A.F.
Capt. Alexander Paul Davidson, R.A.F. and H.L.I.
Flight-Lieut. Joseph Stewart Temple Fall, D.S.O., R.A.F.
Maj. Frederick Whittington Gamwell, R.A.F.
Capt. John Osborn Groves (late R.A.F.).
Capt. Geoffrey Herbert Hooper (late R.A.F.).
Flight-Lieut. Gerald Edward Livock, R.A.F.
Hon. Sec.-Lieut. Douglas Marsh Mackay (King's Liverpool Regiment).
Flight-Lieut. Thomas Henry Newton, R.A.F.
Lieut. Cuthbert Hanson Oliver (S.R.).
Charles Osenton.

Temporary Honorary Membership.—Lieut. W. Coppens, Belgian Air Attaché.

Capt. Gilbert de la Ferrière, Asst. French Air Attaché.

Flying Services Fund.—The report of the Meeting of the Flying Services Fund Committee, held on December 15, 1919, was received and adopted.

House Committee.—The reports of the Meetings of the House Committee, held on December 2 and 16, 1919, were received and adopted.

Fédération Aéronautique Internationale.—The following were appointed to represent the Club at the Meeting of the Bureau of the Fédération Aéronautique Internationale to be held in Paris on Tuesday, January 6, 1920, at 10 a.m.:—

Lieut.-Col. Mervyn O'Gorman, C.B.

Mr. Harold E. Perrin (Secretary).

British Records.—On the motion of the Chairman it was unanimously resolved that the following British Records be granted:—

Pilot: Capt. G. W. Gathergood.

Machine: Airco 9 R. (Aircraft Manufacturing Co., Ltd.).

Motor: 450 h.p. Napier "Lion" (D. Napier & Son, Ltd.).

Date: December 6, 1919.

Distance in a Given Time: Closed Circuit.

Aviator and 1 Passenger.

Time.	Distance.	k.p.h.	m.p.h.
¼ hr.	57.29 kilom.	35.60 miles	229.16
½ hr.	115.60 kilom.	71.83 miles	231.20
			143.66

Speed: Closed Circuit without Alighting.

Aviator and 1 Passenger.

Distance Kiloms.	Time Mins. Secs.	k.p.h.	m.p.h.
50	13 7	228.72	142.12
100	26 1	230.62	143.30
150	38 47	232.05	144.19

Great Britain—Australia Flight.—The following cablegram to the Prime Minister of Australia was confirmed:—

"Subject to verification of machine, Capt. Ross Smith has fulfilled the conditions laid down by Australian Government for £10,000 prize for flight from Great Britain to Australia. The Royal Aero Club, under whose Competition Rules and auspices the flight was made, will award prize to Capt. Ross Smith. Royal Aero Club tenders its heartiest congratulations to the Prime Minister and all Australians on the successful accomplishment of this epoch-making flight."

The following message from Rear-Admiral H. S. Knapp United States Navy, dated December 11, 1919, was read:—

"Permit me to congratulate you upon the successful completion of the England to Australia Flight. The indomitable pluck and perseverance of Capt. Smith and his crew is typical of the spirit of British airmen, and their accomplishment adds another glorious page to the history of aviation achievements."

"Daily Express" £10,000 Prize.—The regulations for this prize were approved.

Facilities for Touring.—Group-Capt. C. R. Samson, C.M.G., D.S.O., R.A.F., and Lieut.-Col. Spenser D. A. Grey, D.S.O., were appointed a Sub-Committee to consider what steps the Club should take regarding the publication of aerial routes and maps for touring.

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.*

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

H.R.H. PRINCE ALBERT, K.G. (*Chairman*).

Mr. CHESTER FOX.

Squad. Leader T. O'B. HUBBARD, M.C., R.A.F.

Squad. Leader C. E. MAUDE, R.A.F.

Group Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:

H. E. PERRIN.

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

Subscriptions:

	£	s.	d.
Total subscriptions received to			
December 1, 1919	16,796	15	7
W. M. Lester	5	5	0
J. E. Rosen	1	1	0
Mrs. H. G. E. W. P. Consett	2	0	0
Anonymous	2	0	0
Capt. Leonard Miller. (Being instalment of the profits from the "Chronicles of 55 Squadron, R.F.C. and R.A.F.")	4	0	0
The Rt. Hon. the Earl of Moray	20	0	0
Rolls-Royce, Ltd.	105	0	0
Mrs. V. C. Johnson	26	5	0

Total, December 20, 1919 16,962 6 7

Offices: THE ROYAL AERO CLUB,

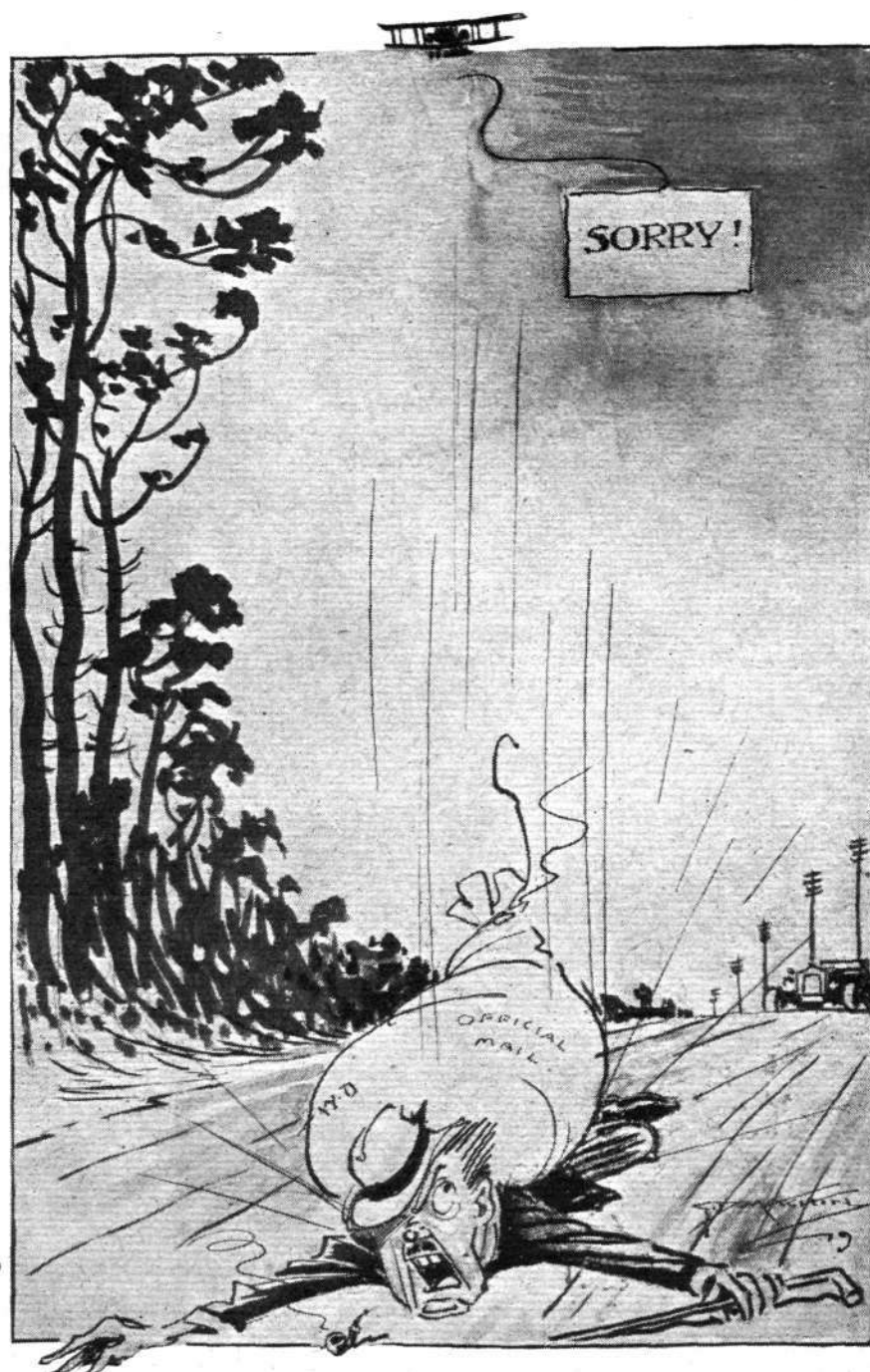
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

AIRISMS FROM THE FOUR WINDS

WHAT with Lord Rosebery's extremely straight and logical talks with Sir Howard Frank, representing the M.O.M., over the Turnhouse aerodrome Dora ramp; Mrs. Strickland Constable's complaints upon the same lines in regard to her property, Hornsea Mere, used by the R.A.F. during the War; Mrs. Tilke Macadam's action for £150,000 in the Scottish Courts against the W.O. for taking possession of her property of Craigengillan (including a portion of Loch Doon) and constructing railways and other works thereon, which proceedings she avers "were unwarranted and illegal"; Mr. J. Proctor's objection to the annexation, compulsorily, of his land at Manston Park, near Margate, besides several other claims upon the same basis throughout the country, the R.A.F. (as the passive medium) is figuring rather prominently just now with unenviable notoriety in the public eye.

But it's the bureaucratic Jacks-in-office—Lord Rosebery dubs them by very different names—who should be blamed, not the R.A.F. The flying units, like the fiddler, have done their best, but all the same they are the ones to be shot at, so far as the nominal responsibility applies. It is to be hoped that the action now being taken by some of these prominent champions of the people's rights may bring to light that a little justice in regard to *meum* and *tuum*, as between "the Crown," as represented by bureaucracy, and citizens, still exists. In FLIGHT we have been for years up against this iniquitous ignoring of private rights at the expense and to the undoing of the individual, when the community *qua* community, should carry the burden of community obligations. Therefore, do we most heartily say "ditto," to all the views of Lord Rosebery and the other victims of the Dora "By Grace" ramp.



MOST ANNOYING: V.—After two years' active service with a fighting squadron in France, to be "wiped out" in England by a mail-bag dropped from above by a careless Handley Page pilot



THE BOULTON AND PAUL "P 9"

ABOUT half a column of type is being used in some of the lay press describing a "wingless flying machine" with "floating power in the air"; comparable with a "dirigible parachute," the "support" of which is "at the top of the structure" and so on. Why not cut it short and get down to business by referring to progress developments on the helicoptere principle?

Is it to be the new Knight of the Garter, Lord Londonderry?

SIR HUGH TRENCHARD's scheme for the permanent organisation of the R.A.F. is as straight a statement of a case as one could wish to peruse. Sir Hugh, as throughout the War, has his whole heart and soul in the Force, and we are glad to see him coming a little more into the light with his views. An opportunity to emphasise the strong opinions he holds as to what the R.A.F. ought to develop into in the not far off future was offered him last week at the annual function of the Chartered Accountants' Students' Society, when Sir

William Plender presided. In replying for "The Imperial Forces," Air-Marshal Sir Hugh Trenchard said the Army and the Navy were long established, and all recognised that each had a glorious record and great traditions, of which the Empire was justly proud, and during the Great War they had added honour and glory to those traditions. But the Air Force, with which he was connected, although it was a new branch of the Imperial Forces, had the air spirit just as much as the great naval spirit and the great military spirit. That spirit was shown in the War when, on one occasion, 12 machines went out to bomb Mannheim, but only one came back. Then a whole squadron went out without orders, and turned what looked like a defeat into a victory. That was the air spirit. One heard a good deal of the necessity of economy, which they were urged to enforce in their various walks of life, but he felt that aerial supremacy was as necessary as economy, and was as necessary as naval supremacy. As the importance of the air became greater, it must be the aim of all to keep that aerial supremacy which had been won by the young men in the Air Service. He hoped that



Two recent types of Avro biplanes: On the top is seen the "Limousine," which provides comfortable accommodation for three passengers, and has a speed range of 40-90 m.p.h. Below is the "Water Baby," an amphibious edition of the Aerial Derby-famed "Baby"

those who helped to build it up would continue to offer their service.

A NOBLE champion in a noble cause. The tide looks like turning.

THE Medici Fountain in the Luxembourg Gardens, Paris, may well be deemed lucky, as a "dud" Hun bomb, apparently dropped by a Gotha upon one of their visits to the city, was found in the basin, which had been emptied for cleaning.

SANTA CLAUS, NEVER LAND. Addressed to "Mr. Santa Claus, Never Land," a post-card posted at Hampton-on-Thames, bore the message penned in childish letters: "Please send me a scooter at Christmas.—(Signed) Ailsa." (*Daily Paper*).

Deuced awkward for Ailsa, though, if Mr. Claus selects the Air as his route for delivery.

FOLLOWING the discoveries, by means of aeroplanes, of buried cities in Mesopotamia and Mexico, owing to the contours thus brought into prominence, a further use, upon similar lines, has been suggested by Mr. D. Gill Jenkins, of Camborne. He says:—

"My experience on the Dharwar Gold Field, India, taught me that lodes, old workings on lodes, dykes, and other similar formations are more plainly visible to the eye at a distance than at close quarters. This is due to a slight distinction in the vegetation on and off the formations. This difference would probably be accentuated by looking down at the country from an aeroplane.

"I therefore suggested to the Non-Ferrous Metal Trades Committee that it might be worth while Government experimenting on these lines in Cornwall, where I am confident there are hundreds of rich tin lodes yet undiscovered."

LIEUT.-COLONEL J. T. C. MOORE-BRABAZON has, in *The Times* this week, taken a hand in the question of a separate Air Force. He makes an excellent point in regard to the attacks which are the vogue amongst Army and Navy malcontents. He points out that: "Attacks on the continuation of a separate Air Force are at present fashionable, both from the Army and from the Navy, for it must be remembered that anybody who was really interested in air in either of those Services left those Services to join the Royal Air Force, and consequently at no time was the Air more friendless in the old Services than at present. The attacks delivered now are, indeed, extremely mischievous, for at present more than at any other time, it is necessary to weld the Royal Air Force into a homogeneous whole with an *esprit de corps*. Most of its officers are old Regulars from the Army and the Navy. They are already creating an Air Force tradition, but it must be remembered that, having made the profession of arms their lifework, and in that many of the acts they have to perform and policies they have to push may be against the desire of the older Services, it is difficult for them to continue

acting wholeheartedly for the Air Force if there is this mischievous agitation to spread the belief that, sooner or later, they will be returned to their original Service."

AMID the alleged crash of old institutions—none so great as people believe, for they have merely skidded awhile from a bad post-War landing—it is good to see the continued survival of that curious *revue*, the Westminster Latin play; none the less curious that it is not invariably Latin as meant, though unquestionably as spoken. As might have been expected, flight events have not been forgotten in its allusions, for which one understands the brothers Barrington-Ward—both past Captains of the School—are responsible. One does not presently remember the Latin author whose style included such mannerisms as "audistin" and "secretumst," but Ctesipho, "the controller of everything," means it well doubtless, as "Don't you hear?" for the beginning of an air-raid. Admiral of the Fleet Demea, however, having a telescope, will not commit himself so far, but merely says he sees nothing. Here, however, the Roman boy-scout rushes in, crying "Tecta petenda Omnibus," or "All take cover," in its freest translation; only to re-enter later with the news that it was a false alarm that came from our own pilots. Meanwhile Admiral Demea has evidently imagined himself back at the docks, sampling the coarser vintages of Tusculum, to which only could the phrase "Omnia clara" apply, for "All clear." One rather suggests "pertuta" or "exita" as the truer subjective participle.

Enter next—lest worse grammar befall—Aeschinus, the Transatlantic airman, replying to the boy-scout's "Hullo, what did you do in the great war, daddy?" "I came, conquered—and perished"; and to Admiral Demea's question "From what neutral coasts have you come?" answers "From America, in failing wings," and wearily, "that is so, and the machine is all broken up" "et in medi mea cauda defuit oceano" for "My tail dropped off in mid-ocean"; brightening up nevertheless with "But I earned the prize."

BETTER still, however, is his later squabble with Admiral Demea as to who won the War, the old man claiming that Ctesipho should really praise him rather than Aeschinus. For to the latter's scornful "What have you done?" the Roman Jacky Fisher replies that "We"—the Admiralty—built a huge and mysterious submersible vessel, which shall be nameless, and that "we" acted as advisers. Whereupon Aeschinus asks "Of what kind?" only to be told that it is a secret, among others which "are included in his book of memoirs." So with scorn he rejoins, "Oh you wicked old man, you work for the Times;" but Demea, not to be outdone, says, "And how much public money has been spent on you?" and "How many cars have you got?" After thinking, Aeschinus is forced to admit he has six. And so ends the tale with a further claim by Controller Ctesipho that "he invented that wonderful machine the tank."



A VERY SPORTY NIEUPORT SINGLE-SEATER: This machine is practically a [modification] of the "Night-hawk." It is said to possess a remarkable turn of speed

AVIATION IN PARLIAMENT

THE AIR ESTIMATES.

In the House of Commons on December 15 the 1919-20 Air Estimates were considered in Committee to enable general questions to be raised.

Maj.-Gen. Seely, in moving to reduce the vote for pay by £100, said the point which seemed to make these Estimates bad Estimates was that the man who was responsible for the expenditure of £40,000,000 to £50,000,000 now and would be responsible for the expenditure of 14 to 15 millions in future in a matter which more vitally affects our national defences, and, therefore, our national life, than almost any other, could not give more than one-tenth of his time to the business. There really was not time for a man who was Secretary for War to do all the work that falls upon him, and to ask that man of all others to undertake the work of looking after estimates of this size, involving such important considerations, seemed a proceeding so extraordinary that he asked the Committee to say they would have no more of it. The arrangement was bad because it was contrary to the decision of Parliament, which had unanimously passed a Bill setting up a separate Ministry. It was also unfair to the Admiralty. If the advances made in connection with the dropping of torpedoes from aircraft continued, it was probably true that the whole of our conception of naval warfare and strategy would be completely altered.

He pointed out that the arrangement could not be justified on the score of economy, for the £2,500 saved on the Minister's salary would be more than absorbed by the liaison officers rendered necessary. It might be argued it was a step towards a Ministry of Defence, but it was really a step away from it.

Mr. Bonar Law: The right hon. gentleman took a line of argument which I think is entirely wrong. He laid before the Committee the vast work which this new force has got to do, and he seemed to assume that the man to do all this exploring and all this examination as to the future possibility of the air was the political head of the Department. I think that is entirely wrong. I should like to say this to my right hon. friend, that there is no part of our fighting forces in which I take personally so great an interest, and if I believed for a moment that the effect of this arrangement was to destroy the future usefulness of this service, I would be one of those most strongly opposed to it. But I do not think that is so, and I have looked at this matter entirely from the point of view, not of theory but of how it was working in the circumstances in which we are placed today, and I confess, without wishing to enter into the details, I really am at a loss to understand the position of my right hon. friend in this matter. It is idle to say that this arrangement is going back on statements made, amongst others by myself, that we were to have an independent Air Force.

Maj.-Gen. Seely: The Air Ministry.

Mr. Bonar Law: That does not depend on who is the particular individual who is political head of that Ministry. How could it? Over and over again in our political history one Minister has filled more than one post, and my right hon. friend has no more right to say that the Air Force is being sacrificed to the Army than those in favour of the Army would have the right to say that the Army was being sacrificed to the Air Force—absolutely no right. Therefore, in my judgment, the one question which the Committee has a right to know, and on which to ask for an answer, is whether or not it is true that it is impossible for one man to fill adequately the duties of the two posts. That is really the one question. There is one argument which has been suggested, and I admit at once it will be a vital argument, if sound. That argument is that, because the Secretary of State for Air is also Secretary of State for War, that therefore the Navy is being sacrificed to the War Office. If that were true, we could not have a worse arrangement. I have taken, so far as I could, some trouble personally to find out not whether this is a good plan in theory, but how it was working. I have consulted the heads of the Air Department, and I have spoken also to those who represent the Navy.

Maj.-Gen. Seely: The First Lord?

Mr. Bonar Law: Yes. Of course it is true that in any rearrangement of Services there must be great difficulties between the Admiralty and the Air Ministry. There must be, but those difficulties will only be great if he takes the point of view of the Army and not of Air in these questions. Difficulties will not arise in any other way. I have made it clear there are difficulties, but I can say with absolute confidence, after discussing it with the First Lord, that there is no reason whatever to suppose that the difficulties have been or will be greater because my right hon. friend happens to be Secretary of State for War than if he were dealing with them solely as Secretary of State for Air.

I think that is nearly all I have to say on this subject; but there is another aspect of it that is worth considering. We do not put this forward because we save £5,000 a year in salary. That would be childish, but I do ask the Committee to bear this in mind. If the Air Force is to be properly developed, and if you are to make the best of it, that does not mean that before you have a proper examination, and before the experts have gone into every aspect, that you have to continue a great expenditure of money. That is not really developing the Air Force. The Committee must bear in mind that there is an immense difference between a force which was spending close on £400,000,000 a year and a force which as far as we can see at present will spend £15,000,000 per year, or the equivalent of £6,000,000 pre-War money. There is something more than expense and efficiency involved in this matter. You may think that that Service is more likely to have its end kept up by a man of the distinction, if I may say so, of my right hon. friend, who has taken at least as much interest all through in the Air as any other Minister, than by somebody else who obviously could not be one of the most important members of the Cabinet. The two most important questions at the moment are demobilisation and the arrangement of the Air in relation to the Army.

Maj.-Gen. Seely indicated dissent.

Mr. Bonar Law: I am surprised my right hon. friend doubts that, if he does. Perhaps I am wrong, but I do not think so. Demobilisation and the Air Force go closely together. Assuming that my right hon. friend has not a bias in favour of the Army as against the Navy, if he has not, I think it is a distinct advantage that the same man should have both problems before his mind at the time he is working on them. But there is far more than that. In deciding the extent of the Air Force which we are to keep, we have got to go down to the other problem. "Very well," you say, "you need such-and-such squadrons in the East. Tell us how much infantry and how much artillery you are going to do away with in consequence of receiving these additional airmen." I am sure my right hon. friend opposite must see that these two problems, the question of the size of the Air Force and the size of the armed force, go closely together, and it is an advantage to have the same man looking at both from the same point of view—the view, namely, of getting the most efficient force, and at the same time the least expensive force, which the country can have. I am not going to say anything more. I do not suggest that this is a permanent arrangement, nor do I suggest that my right hon. friend was made Secretary of State for Air merely because he was Secretary of State for War. That is not so; it was discussed between the Prime Minister and myself at the time the appointment was made, but the ground on which it was recommended was not that he was filling the position of Secretary of State for War, but that he was competent to fill the position of Secretary of State for Air and to do the War Office work as well. That is all.

Lieut.-Col. Moore-Brabazon: We have got to look at this thing from the

point of view of what has happened, and I maintain that the publication of what I call the Trenchard Memorandum proves that the Government was perfectly sincere in what it said in saying that it was going to keep the two Services absolutely apart. I want to deal with the Trenchard Memorandum, which is undoubtedly the most interesting aeronautical document that we have ever had put before us, because we see in it a Service actually being born, and I hope that Labour will take a great interest in this, because now is the time to get that Service thoroughly democratic from top to bottom, with great possibilities for everybody to join early. It should be the great democratic force of the future. It was a great reform to get a single united Air Service. I see one or two lines in this Report which disturb me, and if I may I will read them:

"In addition, there will be a small part of it (the Air Force) specially trained for work with the Navy and a small part specially trained for work with the Army, these two small portions probably becoming in the future an arm of the older Service."

Does that foreshadow a return to a small Royal Flying Corps and a small Royal Naval Air Service over and above a separate Air Force?

Mr. Churchill: No.

Lieut.-Col. Moore-Brabazon: I am glad to hear that. If the separate arm foreshadowed in that Memorandum ever comes about, could the Secretary of State tell us whether the cost of machines for those two separate Services will be borne on the Votes of the other Service and not on the Air Vote?

Mr. Churchill: They will be borne on the Air Force Vote.

Lieut.-Col. Moore-Brabazon: I want to make it clear that the position with regard to the Navy has changed fundamentally in this country because of the advent of aircraft. The Navy has lost for ever its claim to be able to defend us against attack, and we have got to remember that. There is no defence against aircraft to-day. The possibility of directing aircraft in a fog to a place hundreds of miles away and there dropping bombs without ever being seen is something there is no answer to today. The only answer is to have a bigger Air Force so as to have the potential power of hitting back. The first object of attack in any future campaign will be undoubtedly, not the military arm of the State, but the industrial arm of the State, and if a foreign Power were to endeavour to hit England, the first place she would try and hit us today would be in our industrial heart, in a place like Birmingham or Glasgow. Could the Army or the Navy possibly defend it? There is only one Force that could defend it, and that is the new Air Force.

Now I want to say a word on civil aviation. I hope Labour will take an interest in this question, because we see starting now a new power, a new industry, and, if we do not look out, new vested interests. What was at the back of the minds of the Advisory Committee was how to avoid building up a goodwill against the State, and to arrange some scheme whereby the State at some time could take control of all aviation throughout the world without having to pay for vested interests. The recommendation was that all aerodromes should be State-owned. The expenditure for that is not a very big item, and I should very much like to hear from the right hon. gentleman the Secretary of State for War whether the Government intend making good the recommendations of that Committee. I hope we shall hear from the Secretary of State for Air to-night that no policy of destruction in any particular will prevail on the Government that may spoil or impair the proud position this country holds today in aviation.

Mr. Lambert: The Leader of the House, in his speech defending the present arrangement under which by administration, and not by Act of Parliament, the Air Force has been placed under the Secretary of State for War, did not tell us whether it was to be a permanent arrangement or not. Supposing that a less brilliant man than the present Secretary of State for War were at the War Office, would the Air Ministry still be placed under his charge? It is no use talking of "co-operation with the Navy." It is the Navy's business to protect surface ships. If it is not the Navy's business, then I cannot understand whose business it is. We must not talk of co-operation. The protection of surface ships must be absolutely under the control of the Admiralty. I am going to argue that it is wholly wrong to put the Air Ministry under the War Office, and that it should be put under the Admiralty. The entry of officers into the Air Force, as I understand it, is to be through a cadet college. Anyone who thought about naval affairs felt the Navy was built up for ten years before the War upon the assumption that it was to meet the German menace, hence the colleges for the entry of cadets into the Navy were gradually expanded under the control of the First Lord at Osborne and Dartmouth. Are these two naval colleges required today? Are they to be filled up with naval cadets, as before the War? The Air Ministry propose to build a new college in Lincolnshire. Why build a new college when you have two colleges at Osborne and Dartmouth? After all, economy must have some weight with the Government. It certainly will have some weight with the country. Is it necessary to build a new Air College?

Again, let me take the boys. Sir Hugh Trenchard rightly says that the training is the most difficult problem in the formation of this Force; he advocates that the men should be brought in young. The Admiralty have got buildings for this purpose at Shotley and Harwich. Then there are the establishments, the *Vernon* and the *Impregnable* at Devonport. The boys are trained there. The Navy of the future will not be so big as was required in the past. Therefore, why cannot you utilise the Admiralty establishments for the training of the officers and men of the Air Force?

Mr. Mosley: I believe we are living in a period which is seeing what I may call the passing of the super-man or the "twilight of the gods." I do not for one moment say that if any man could fulfil this dual function my right hon. friend the Secretary for War and Air would not be capable of performing it. Surely, when we read that Memorandum and all the far-reaching proposals contained therein, we are impressed by the fact that it will take one man more than his full time to grapple with these problems. The contention of the Leader of the House, it seems to me, is that one man should make himself responsible for all these great innovations which we are now witnessing. In all the great ramifications of modern organisation the political head of the Department cannot go into every detail. We all admit that. At the same time he ought to go into every detail he possibly can in a full-time job. If it had been argued that it would be better to set up a Minister who could exercise a joint supervision over the three Departments—Army, Air and Navy—delegating almost absolute power in matters of detail to three Under-Secretaries, that is a contention which we could have understood. At the present time, however, we have a most anomalous arrangement. There is no logical difference between three completely independent services with chiefs and a Ministry of Defence with three services co-ordinated by him under his control. The Leader of the House left us in the dark as to what was the future intention of the Government.

Maj. Glyn: I want to say a word or two with regard to the relation between the civilian side of aviation and its military aspect. In this breach we are dependent upon the extension of the civil side for numbers. If we had an independent Minister and air force we should not confuse it with the immediate requirements of the Army or the Navy. There is such interdependence between these forces that we should regard an aeroplane as a military weapon adaptable to civil conditions and able to be readapted to war

purposes, and unless you have a Minister who will assist civil aviation we shall be hard put to it in time of stress to find the requisite number of machines. Just as declarations of war are becoming less and less formal in spite of the League of Nations, we must not overlook the possible use of the most modern means of any nation to gain its ends. What is to prevent a nation with plenty of aeroplanes making a sudden raid on a country not prepared for defence.

The pushing of the civil side of this problem necessitates the maintenance at least of an Under-Secretary, if not of a Minister, and when the time comes for the formation of a joint Imperial Staff the constitution of each of the Services should be considered equal.

Chemical science has developed very quickly, and just before the Armistice gas-bombs were improved and we had produced a gas so effective that if 5 per cent. of it was mixed with 100 per cent. of the atmosphere it proved fatal. We have to realise that you can now go to Cologne in an aeroplane in 3½ hours, and it would take that time to walk to Woolwich. What would be the feeling of our people if an enemy bombed Woolwich? There would be a tremendous outcry, and a demand that our defences should be made adequate. I think we should treat this subject of dealing with air warfare as a separate force. I think the greatest point of all is that in maintaining the Air Force you are maintaining a great prestige.

I think it is equally important to realise the state of affairs with regard to aeroplanes at the time of the Armistice. Germany on November 11 had 4,000 machines on the Western Front, and in reserve and in depôts and at schools she had 14,000 machines, and the output in Germany was estimated at 1,000 machines per month. Marshal Foch's terms were that Germany should surrender 2,000 machines. Of course, the French took their quota, but that leaves 8,000 machines unaccounted for. I think we should have demanded more aeroplanes and prevented the Germans from doing what the latest evidence shows they are doing. They have now 7,000 miles of aerial routes with alighting arrangements and definite transport services. This has been done to foster the power of striking in the air, and they are at the same time assisting their commercial industries.

What are the definite arrangements that have been made to encourage those who serve in the Air Force to be ready to man these machines which we hope the Government will keep in being, either by a direct subsidy or otherwise?

Rear-Admiral Adair: The Naval Air Force, I claim, is distinct and should be part and parcel of the Navy itself, and should never be dissociated from it as it was even in the R.N.A.S. We want it manned primarily by naval officers and seamen.

There must be an absolutely independent force. The whole atmosphere of the air is open to it, but it has nothing to do with the Navy. It seems to me that the Chief of the Staff thoroughly understands the situation. He advocates, just as I do myself, three forces, and I cannot help thinking that he is absolutely right. An Air Force today is an absolutely essential constituent part of the Navy. We cannot do without it at the present time. We have heard a great deal about the Navy of the future. Some people want to destroy it offhand, and others are a little more modest. There are those who say that it can no longer exist on the surface or as surface-borne ships. There is that very well-known officer who has been quoted several times who states that presently we shall have aerial armed battleships. It is quite possible that we may have all sorts of aircraft, but there is this about every type of aircraft, that nine-tenths of its time is spent either on the land or on the sea. Therefore, any Naval aircraft, whether it be a battleship or something else, should be manned by seamen, manned by men who are seamen first and aviators secondly.

I am not recommending the building of battleships at the present time. We must wait and see what are the possibilities of the future. I believe that in a very short time there will be craft, perhaps as big as a destroyer, normally floating on the sea, and steaming at a high speed, perhaps getting up to 70 miles per hour, as I mentioned just now, but when the occasion arises spreading her wings and travelling 150 miles per hour through the air. I foresee that, though I admit it may not be in my lifetime, but I do not foresee a battleship aircraft.

Who could possibly evolve such craft other than naval constructors, and, seeing that nine-tenths of their time they must be on the sea, who is going to man them except seamen, and, if they are to be evolved by naval constructors and manned by seamen, who can administer them other than the Admiralty? It would be really ridiculous to leave it to the Air Ministry, constituted as it is at present, to evolve such craft or to administer the personnel of them. My object has been to bring home to the Committee the fact that the Air Ministry are not competent to deal with the naval side of the question. The Chief of the Staff foresees that it will be a separate arm. It is a separate arm already, and its development as such must start at once under the auspices and direction of the Admiralty alone.

Capt. Wedgwood Benn: If such a misfortune were to happen as that we were to hand over to the Admiralty a part of the Flying Corps, that force would be amputated in a way which would produce atrophy and even death.

Were the hon. and gallant Admiral's suggestions to be accepted it would mean this, that you would get a type of pilot acquainted with a certain kind of machine only. At one air station they are all in favour of the F.3A. boat, while at another they say you cannot beat the Sopwith seaplane. It is one of the dangers in designing types of aeroplanes to give way to pilots' prejudices, for the pilot is not always a very safe guide as to the best type of machine to take the air.

I understand the plan of the Air Ministry to be to select boys who have passed through public schools. I believe they have rejected the plan of taking boys at 13—the Osborne or Selborne scheme—and have put that aside in favour of taking boys from public schools, because they say that public school education gives a boy a certain amount of "savvy," or self-confidence, which is so requisite for the handling of machines in the air. That may be true. I do not know whether it is so or not. But the difficulty is this: If you restrict your boys to boys who come from public schools you limit the choice to boys of a certain social class.

Mr. Churchill: There will be promotion from the ranks—from the mechanics, and so on.

Capt. Benn: Personally, I do not think promotion from the ranks meets the case. My experience is that people promoted from the ranks never have the status of the officers who have entered direct.

There is one other point that I want to emphasise. I think there is too much tendency in the Air Force to exalt the pilot at the expense of the science—I am using the words in the broadest sense. The man who is a stunt flyer and can perform in the air is apt, especially among the community, to get a predominance which is not altogether good for the Service. What is required is more the man who corresponds to the engineer in the Navy, the man who takes an interest in the scientific side of his work.

I suggest to the right hon. gentleman that the real course to pursue is not to standardise. It is quite obvious that, with the money at his disposal, he cannot possibly carry out the whole of the work of defence and the design of machines. I suggest, therefore, that his real course would be not to standardise a type which is already obsolete—every type is obsolete the moment it gets into the air—but rather to devote less money to that, and more to the encouragement of the civilian inventor.

Mr. Churchill: First of all, I would like to refer to the financial aspect. In March, Air Estimates were presented of approximately £66,500,000, and the present Estimate is for £54,000,000, so that there is an apparent reduction of £12,500,000. I say "apparent" advisedly, because

£11,250,000 out of those £12,500,000 are transferred bodily from the charges of the Air Ministry to those of the Ministry of Munitions, and the actual net saving to the public on the new Estimates over the old is only £1,250,000. I am very anxious that the House should clearly understand exactly what the position is, and should not think that we are in any way trying to mislead them as to the actual financial position. This £150,000,000 would have been greater by £2,000,000 if the airships had remained on the Admiralty Vote. We have had put on our charge £2,000,000 for airships which otherwise would have figured on the Admiralty Vote. Therefore the total net actual saving on the Air Estimates as now presented is £3,250,000. To this may be added a further almost certain saving on the Ministry of Munitions Vote through not going on with contracts instead of taking delivery of machines. That is to say that owing to the reduction in the demand we are wiping out contracts by compensation instead of by taking delivery, as was done the first few months after the Armistice. It is probable that the reduction will at least amount to £3,000,000, and it may be more; so that the total benefit to the Exchequer is in the neighbourhood of £6,250,000, to which may be added the £400,000 which my right hon. Friend was able to secure by his judicious sale of one of our airships to the United States, and possibly by other sales which are in contemplation and which were not foreseen when the Estimates were originally introduced. Therefore the saving is not £12,500,000, but the public may consider it is better off by the changes which have taken place by something between £6,000,000 and £7,000,000.

These Estimates which are now laid for the Army and for the Air Force are not the Estimates for next year. They are the Estimates for last year, which ought to have been presented in March. It was not possible to prepare them, and I promised that both Estimates should be laid before the end of the year. I am doing this in fulfilment of my pledge. But, of course, we are only separated by a few months from the time when the new Estimates will be introduced. By the end of February or the beginning of March whoever represents these Departments will lay the new Estimates before the House, and there will be a long series of opportunities of debate and discussion on all matters connected with Air and Army policy. I shall reserve till then the task of making a full statement on the Army.

I think it desirable to have published a full outline of the new scheme for the permanent post-War Air Force which has already been laid before the House. The post-War Air Force is much further advanced in shape than either the Army or the post-War Navy. This scheme has been worked during the year in considerable elaboration. The Estimates of 1918-19 for the Air aggregated £370,000,000, including the Vote for the Ministry of Munitions for aircraft. In 1919-20 they have fallen to £54,000,000, and the limit which the Cabinet has approved for the framing of the Air Force Estimate next year is approximately £15,000,000, so that whatever else may be said, a very great reduction is being effected in the scale of our expenditure. Discount it as you will, criticise it as you may, the fact remains that the whole standing of the Air Force has been in the currency of the present year reduced from its great War level of expenditure at more than £1,000,000 a day to an expenditure which will not exceed, in 1920-21, £15,000,000. These financial considerations are very necessary to bear in mind.

I hope the Committee will not underrate the very considerable merit of the achievement accomplished in elaborating this scheme. During the present year the Air Force has had to be reduced from an enormous war organisation, rapidly expanded in every direction, down to almost nothing, and a modest, compact, permanent peace-time Air Force is being erected out of and upon its ruins. Whereas the Army and the Navy both had permanent pre-War structures to fall back upon and reduce down to, and were strongly organised and established on that basis, the Air Force had nothing at all except its emergency War organisation. At the same time a double element of uncertainty was playing over the whole field, namely, uncertainty as to the rate at which the German and Turkish situations would allow demobilisation to be carried out, and, secondly, uncertainty as to how much money would be allocated for the permanent post-War Air Force. It was inevitable during this period of arrest, of dissolution, of uncertainty, and of reconstruction, that everyone should feel disquieted and uncomfortable. The Air Ministry had not only to work out plans for the future in all their detailed complexity, but they had to have two or three sets of alternative plans carried forward simultaneously through all their variations and complications, so as to be ready to come forward with a complete scheme at an early date, in accordance with whatever scale of Air Force was ultimately sanctioned by the Cabinet. I confided this task to Air-Marshal Trenchard, and with his staff he has been engaged during the last three or four months on its execution. Early in October the Cabinet definitely approved a permanent organisation for the Royal Air Force on a scale of approximately £15,000,000 a year, of which the India charges will be borne by India. This organisation has now been elaborated in full detail, and every move in demobilisation, the transfer of stores, surrender of aerodromes, etc., has for some time past been made in direct relation thereto. The full organisation will, of course, be laid before the House when the Air Estimates for next year are produced. Meanwhile, we claim the fullest liberty within the ambit of the scheme now presented to make such variations, refinements and improvements as further experience and study may suggest. But the central principle which has always been followed throughout this year has been the maintenance of the independent status and identity of the Royal Air Force, and, secondly, the gathering to the Royal Air Force of all those elements necessary for its permanent integral existence. Every step, in fact, has been taken on the basis of there being three separate independent Services for sea, land, and air, respectively, capable of forming part of a higher organisation of Imperial defence as a whole, and no step inconsistent with this ideal has been allowed. Differences of uniform, decorations, etc., have been preserved by the Royal Air Force. A new set of ranks and titles, specially devised because they were distinct, as far as ingenuity could make them, from those in current use in the Army and Navy, have been brought into force.

Everything possible has been done to strengthen the Air Ministry and lend body to the Air Force. The Technical Department of the Ministry of Munitions has been transferred from the Ministry of Munitions to the Royal Air Force. Anyone who knows what is involved in that will realise how vitally important it was for the future independent organisation of the Air Service that this Technical Department should so be transferred. The meteorological research has been assigned definitely to the Air Ministry. Civil aviation has been rescued from the ambitions of the Ministry of Transport or the Board of Trade and definitely assigned to the Air Ministry. All the course of the present year has, in fact, been occupied in building up by every means a separate independent Royal Air Force and in making an organisation which will effectively prevent any future combining up of the Air Service between the Army and the Navy. My hon. and gallant friend asked for a special assurance on that point, and I am glad to give it him so far as I and the Government are concerned, who are now responsible for the direction of affairs. We are moving forward with the scheme outlined by Sir Hugh Trenchard in his Memorandum in such a way as to make it extraordinarily difficult at a later stage to make any of those disruptive decisions which would bring the Air Force into two separate, subsidiary branches of the Army and the Navy, which would be fatal to the development of the air spirit and of the Air Force as a great new army. We are rapidly reaching a position which will make it almost impossible to arrive at such a change without the greatest amount of waste and expense should it be decided upon. It will take approximately, five years to bring the permanent post-War Air Force into

the same kind of running order as were the pre-War Army and Navy. I do not mean that the scheme will not be carried out and brought into action very rapidly, but before you can have an Air Force running in a smooth, regular way as a permanent and long-established Service, in my opinion three, four, or five years will be required of continuous work in pursuit of a definite line of advance. Estimates have, accordingly, been worked out not for one year only, but for five years, subject, of course to such modifications as may be found desirable.

The R.A.F. is in want of practically every permanent institution of a disciplined service. No service has ever approached it in complexity. Nearly every trade and every science finds its part in aerial warfare. Even the complexities of the modern battleship, with all its technical departments grouped together in its vast machinery, falls far short in number and in delicacy of the subsidiary services which are essential to an efficient air force. Therefore, at the outset schools, colleges, training centres, experimental establishments of many different kinds have to be called into being and organised. Mr. Lambert thinks that because the Navy will not be training for the next two years so many officers as it was before the War, there will be a certain number of beds vacant at Dartmouth and Osborne, and he thinks that these extra places in the class rooms and the vacant beds in the dormitories may be made the birthplace, the cradle of this great new Air Force of the future. I do not think my right hon. friend's suggestion is practicable. The Air Force must have establishments of its own. I do not think you will ever build up a proper Air Force if you are to occupy any spare accommodation which may be found from time to time available in buildings at Dartmouth or elsewhere.

I am quite certain that the contraction in the Navy, while it may leave unoccupied some portion of some wing or annexe of these colleges at the time, just as the contraction at Sandhurst will leave some portion of the building not fully occupied, that contraction will not enable us to get there the schools or the class rooms required for the Air Force. We have to have these establishments for the Air Force. If it is to be a real living thing, it has to have its proper plant and accommodation in which it can settle down. The cadets have to be trained to be officers, and the officers have to be trained in the different specialised branches of their profession, and those branches involve the studying of the special needs of the Army, the Navy, and the Independent Service. The very list of schools and training centres, which is attached to the paper which has been published, which have to be created will show in a comprehensive and impressive way the complexity of the tasks which Sir Hugh Trenchard has had placed upon him. Officers have, further, to be trained to become air staff officers, to understand not only air warfare as such, but air warfare in combination both with the special and general requirements of the Army and the Navy. Mechanics have to be trained from boys upwards in all the different trades, some highly scientific trades, on whose trustworthiness the Air Service depends for its efficiency and the flying men for their lives. Fortunately, there is at the present time no lack of centres where new establishments can be set up. There are many enormous war plants which were called into being all over the country, and the task has been to select according to some concerted plan the best and most convenient centres for the R.A.F. At Cranwell we shall have the Air Force Sandhurst. At Halton there will be the Air Force staff. At Halton also there will be the main training establishments for mechanics and artificers, similar to those which the Navy had before the War on board certain ships. The photographic establishments will be at Farnborough, and the main wireless schools at Flowerdown. The gunnery school will be at Eastchurch. There will also be a navigation school. There will be three store depôts and two aircraft repairing depôts, one at Kidbrook, and the other at Donibristle. All these establishments exist at the present time. The land is there and the roads are there, and an enormous amount of work has been done. The buildings are there, but although the centres are available the buildings are in nearly every case either lacking in completeness, or of the most flimsy wartime character.

It is quite impossible to maintain a permanent service in healthy discipline without that reasonable degree of comfort which can only be afforded by permanent habitation. During the next three years we have, therefore, to spend a considerable proportion of our limited funds available for maintaining the Air Force on bricks and mortar. That is to say, we have to replace the temporary buildings which can be used at the present time by permanent structures which will be satisfactory to the health and comfort of the personnel. However, during these same years, it happens fortunately that practically no new construction of aircraft is required except for experimental purposes. We shall continue repeatedly to experiment in type, each type an improvement upon the other, but we do not require any bulk production in the next two or three years in aircraft. We have left over from the War an enormous accumulation of stores and aircraft. The great accumulation in stores and aircraft enable reductions to be effected in both these votes. When you look at the Air Force's financial position on the basis of five years, and not on the basis of a single year, the convenience of that method of treating the subject becomes apparent, because it has been found possible to aim at balancing the initial expenditure on housing the R.A.F., by the initial saving in regard to stores and equipment arising from our special circumstances. Within that five years the estimates on the building programme is a constantly dwindling charge, while the technical equipment expenditure rises step by step to maintain on the whole a uniform level of estimate.

The £15,000,000, which is the approximate figure, includes £2,000,000 for research and civil aviation. That amount will be provided for in next year's Estimate. We are allocating £500,000 in the present year, and we have spent £329,000 on civil aviation in the present year. That is due largely because plans which had been formed did not fully mature within the compass of this year. Of course nothing would be worse than to try to spend money without obtaining full value for all the money that is spent, and without having a very judicious control over the expenditure.

Out of the £15,000,000 we are providing £2,000,000 for research and civil aviation. Here let me deal with those people who say, "It ought to be the other way round. You ought to provide £13,000,000 for research and civil aviation and the other £2,000,000 should be good enough to manage your military affairs." It is not a fair argument to say that the first charge ought to be civil aviation, and that the military needs should be provided for at a later stage. I must remind hon. members that we have still an Empire to defend. Odd as it may seem on the morrow of unheard victories, we have all those dependencies and possessions in our hands which existed before the War, and in addition we have large promises of new responsibilities to be placed upon us. The first duty of the R.A.F. is to garrison the British Empire. Out of the 24½ fighting squadrons which the Trenchard memorandum contemplates forming at once, no fewer than 10 are abroad, or will be stationed abroad. Eight will be in India, seven in Egypt, three in Mesopotamia and one is to be split up between the various naval bases. The maintenance of all these forces permanently abroad, the training of officers and men, the regular circulation of the units on the roster between home and abroad—because we intend to preserve the regimental idea very strongly in regard to the fighting squadrons of the Air Force—all these functions in the Air Force as in the Army will be found to absorb the greater part of the modest sum at our disposal. When to these are added the two fighting squadrons which are all we can maintain at home and the 2½ squadrons which will be working with the Navy, and the one which will be working with the Army—I am supposed to be exceptionally favourable towards the Army as against the Navy; but it will be seen that only one squadron is allocated to the military

division as against 2½ allocated to the Navy—the rest of the force will be on independent duty abroad.

When we have considered all those, and the necessary schools and the training and experimental centres and the general establishment charges, the whole of the available sum is absorbed with the exception of these £2,000,000. Necessity has to come first. The Royal Air Force is now reduced to the very minimum in finance which will enable it to discharge its peace-time military functions and to have an integral independent life as a permanent Service. If, therefore, larger sums are required for civil aviation, as some are inclined to demand, additional money must be voted by Parliament. That must be faced. I do not myself believe that it is the business of the Government to carry civil aviation forward by means of great expenditure of public money. Our business is first of all to do all we can to facilitate the development of civil aviation, to develop the routes and the key aerodromes, to develop the legislation, to assist in all those ways which are open to a Government Department to advertise and push British civil aviation. But the effort which is to sustain it must be a spontaneous effort arising from the country and the trade, and the best thing we can do in regard to that is to make sure that we do not get in the way of it.

I do not propose this evening to embark upon a lengthy statement on this subject. I will reserve that for the Estimates which will be presented in February, as I have so much to say on the military side this evening. But with regard to what my right hon. and gallant friend said on the subject of civil aviation, we have at the head of civil aviation in Gen. Sykes an extremely competent officer, who is throwing a great deal of personal ability into his task, and I feel with great confidence that his treatment of the problem of civil aviation from the Government point of view will be attended by the same measure of success as has attended Sir Hugh Trenchard's treatment of the military. I think it is a great achievement on the part of Sir Hugh Trenchard to have been able, within the narrow limits assigned to him, to work out a complete scheme which meets all the varying needs and duties with which he and the Royal Air Force were confronted. As to the provision for the Navy, very satisfactory relations have been established between the Air Staff and the Admiralty. Admiral Beatty in particular has shown that he is a sincere friend and well-wisher of the Royal Air Force. I look forward to the most favourable results from his co-operation. It is perfectly true that the Admiralty have not got what they asked for. They asked for a great deal more than they got, and I never remember a time, I rarely remember a subject, on which the Admiralty have not asked for more than they have been able to get. We simply cannot provide the trained mechanics next year, even if the money allowed, to meet all requirements of the Navy any more than we can meet all the requirements of the Army. What we have to do is to get our system established, our training plans at work, to get our establishments in full activity for preparing the personnel of the new force. The scheme which is outlined by the Chief of the Air Staff is the most which is physically practicable within the time and limits available. But I give the general assurance that the Air Ministry will do their utmost to study the special needs of the Navy and meet them in every possible way. Those who seem to think that we are immediately on the verge of some enormous development whereby battleships and surface craft will disappear and will be replaced either by a submarine Navy or an Air Force, or a combination of both, must realise that in proportion as such evolution obtains the support of professional opinion, in that very proportion the large funds which are now spent on the construction of a surface Navy will be liberated and be available for the development of additions to the Air Force.

But the task before us is severely practical; we have to find the necessary air garrisons to defend the British Empire, to create a permanent independent Air Force, to offer young officer airmen or mechanics a decent regular life in a good profession to which it is an honour to belong. This is a task which is self-contained and must be discharged quite apart from any theoretical decision either for revolutionising either the art of war or for the combined organisation of the three Services. It would be a great mistake to delay the practical steps which are needed until an entirely new system of defence organisation has been thrashed out and developed. To make it a unit, to make it in a form where it is not only efficient in itself, but will fit into a higher organisation—that is the practical task on which we are engaged. But if the Air Force is to be independent of the other two Services, it must also be interdependent upon them. It must be so organised as to fit naturally and easily in peace or war into a combined organisation of defence. It must be that for its own sake, in the interests of the other Services and in the general interests. Take the case of officers of the Air Force, for instance. Every Service must offer a reasonable advancement to young men who enter it, but a boy entering the Air Force ought to have as good a chance as a boy entering the Army or the Navy of making a career for himself. But as the proportion of general officers during the flying period of their lives in the Air Force necessarily exceeds very largely the proportion of higher posts, therefore we have to turn to the two great Services to assist us, and we have to adopt a system of temporary commissions. About 50 per cent. of the Air Force will be composed of its own officers in permanent commission, 40 per cent. will be the short-service commissioned officers, and 10 per cent. will be birds of passage from the two other Services. It may be in future years that it will be still further extended.

It is good for us because it reduces *pro tanto* the pressure of candidates on the limited number of higher appointments. It is good for the other two Services because it familiarises them with the air, and later on it will give them the higher officers who know the true value of the air arm. It is good for all because it tends to promote that solidarity and unity with regard to defence organisation which is more and more demanded by those who are thinking out these problems, and it tends to eradicate the absurdity of mere departmental conceptions of war. Meanwhile the Air Force is dependent upon the Army and Navy for a certain proportion of the officers who will be flowing through it. There are certain subsidiary services which the Army and the Air Force can have in common. For instance, we have arranged to have the mapping Department in common. The rations are supplied to the Air Force by the Navy and Army and not purchased direct by the Air Force. The Air Force clothing is bought from the Army Clothing Department at Pimlico. The ordnance is supplied by the Army. The Air Force has its own technical supply, but in these more simple forms of supply there is not the slightest reason why purchasing should not be made through the existing organisation of the Army. The medical service is at present entirely separate. The chaplains' department is separate. It requires careful consideration as to whether it is necessary or proper to continue to duplicate any of these services. All this ground has to be very carefully studied in order—first, to secure the independence of the Air Force; second, not to waste money in duplicating organisation; and, third, not to take any steps inconsistent with the future combinations of the three fighting Services on the basis of common departments for common services. There is no doubt that very large economy and simplification would result from the combined treatment of defence problems, instead of having, for instance, two or three organisations. Instead of having two or three organisations for buying meat and bread, you would have one for all. Instead of three finance and contract branches, you would have one for all. Instead of three medical departments, three sets of hospitals, and three chaplains' departments, there would be one. These are very revolutionary ideas, and progress towards them can only be made gradually; but progress towards them must be continued, and nothing must be done in reconstructing the Air Force which in any way

conflicts with the final system to which we will certainly be drawn by logic, by economic and by war efficiency, and, in fact, by everything except existing vested interests—namely, a combined general Imperial War Staff for the three Services, actuating and operating under single control. Air power may prove itself—many people declare it has proved itself—a substitute for other more expensive forms of man power or sea power. But it is obvious that any question of such difficulty as substituting one set of developments for another, or increasing air power at the expense of existing forms of naval or military effort, for instance, can only be dealt with upon the advice and through the agency of a combined general staff who feel impartial as to the method or instrument employed, so long as they are best and the right ones for the country to use. Therefore, I find myself in strong personal sympathy with the remarks made by Major Glyn in regard to the creation of such a joint staff. I hope that the discussions which are now taking place between the professional heads of the three Services, the First Sea Lord, the Chief of the General Staff, and the Chief of the Air Force, may be productive of real advance in this most urgent and important matter.

Here a word as to the position of the professional head of the fighting Services. I consider that in practice the control of the fighting Services is best exercised through the close co-operation of a Cabinet Minister and the professional head, who should be the principal soldier, the principal sailor, and the principal airman of the day in the fighting Service. As long as that arrangement works well everything works well, and when it breaks down the personality should be changed either in one direction or in another. This close co-operation involves almost daily intercourse between the Minister and the professional heads. It is not possible for a Parliamentary Under-Secretary to be the intermediary. It is not possible for the Under-Secretary to be the channel of all communications passing between the professional head of the Service and the Minister responsible. It has never been so at the War Office or at the Admiralty. The First Lord must deal with the First Sea Lord; the Secretary of State for War must deal with the Chief of the Imperial General Staff; and, similarly, whoever holds the seals of the Air Ministry must deal with the chief of the Air Staff. It is the chief of the Air Staff who is the one to insist on his right of direct access to the Minister responsible, for otherwise everything would have to be taken once to the Under-Secretary and then again to the Minister who had to decide.

The view I take is this: that the initiative in Service matters must in the main come, and as a general rule comes, from the professional head. He plans, he outlines, he proposes. The Minister examines, criticises, suggests, discusses with his Board or Council, and finally approves. That is the right way. It really is the only way to carry out a military policy. It is not possible for the initiative in such matters to come from the Parliamentary Under-Secretary, and it would not be fair to the professional head of the Department, nor would it be wise, nor would it work in practice. Just as I think that the initiative should, in the main, come, in the case of air policy, from the chief of the Air Service, in the case of the Army from the Chief of the General Staff, and in the case of the Navy from the First Sea Lord, so in the three Services together I hope that the initiative for joint action will come from the three heads sitting together, and that as a result of those conferences which are taking place proposals will emerge which will lead to the creation of that joint Imperial Defence Staff, which at the present time is so indispensable from every point of view.

Sir D. MacLean: The Secretary for War has taken great credit to himself and to his Department that this is the only one of the three great Services which has effected a reduction, and he has told us, with great frankness, that the real reduction is to £60,000,000. What will an anxious public, think when with a shock it comes to know that the Air Force was to be maintained during the current year at an expenditure of £66,000,000, and to what extent will it be satisfied when this splendid campaign of economy has reduced the total to £60,000,000?

Mr. Churchill: I meant to give the figures in my speech. Let us take £15,000,000 as representing a normal year. The difference between that and the present expenditure is £39,000,000. Liquidating war contracts and equipment, apart from the Ministry of Munitions, accounts for £12,000,000; liquidating works, £3,000,000; decrease in maintaining war force above the normal amount accounted for £4,000,000; war gratuities accounted for £5,000,000; the pay of abnormal numbers above what will be maintained next year, due to the military situation, accounts for £12,000,000; minor miscellaneous items account for £3,000,000. That gives a total of £39,000,000, all accountable to pure and definite war charges and war necessities, and not in any way attributable to mismanagement.

Replying to Captain Benn, Mr. Churchill said: The final wind up of the Women's Royal Air Force was much more rapid than was at one time contemplated. There was what was, perhaps, a pardonable reluctance to scrap and disband a force which had rendered such admirable service, and it led to the view being formed that they would be continued rather longer than was

the case. Certain articles of clothing were issued and purchased which, had it been known that they were not to continue, would undoubtedly have been dispensed with. But on the whole the more rapid demobilisation which has taken place has overtaken that expenditure and has provided economy of a different character which on the balance leads to a position of advantage.

On the Technical and Warlike Stores Vote, Mr. Churchill, replying to Capt. Benn, said so far as the mechanical transport of the Air Force is concerned, I have not yet finally reached a conclusion as to what extent we can pool with the Army. I am certain we can pool reserves with the Army; so far as the ordinary pool of cars is concerned we can pool reserves. Of course, the mechanical transport repair department at Shrewsbury, which is under the control of the R.A.F., we hope will be wound up and handed over to Slough, which, although it has been very frequently abused in this House and out of it by ignorant persons, is increasingly establishing itself as a paying asset in the State and is vindicating in a most conclusive manner the wisdom and foresight of those concerned in its initiation. As far as civil aviation is concerned, I have the figures here. I said the total was £329,000, and these are the principal items: Meteorology, £25,000; pay (salaries), £39,000; air routes, Cairo to the Cape, £50,000; Karachi to Australia, £40,000; purchase of land, etc., £50,000; minor new works, £25,000.

Maj.-Gen. Sir Newton Moore: Is there any provision for a route beyond Karachi? Is there any provision for acquiring land at either of the stations that would be required between there and Australia?

Mr. Churchill: Oh, yes. This present flight to Australia has been done along a route which the Civil Aviation Department of the Air Ministry has been prospecting and developing. Only one machine has so far got through, but the trail has been blazed, not only as far as Karachi, but right away through to Australia. Of course, I think the best part of the route will be the Cairo, Baghdad, Karachi route, and there anyhow you will have large air establishments for fighting or strategic purposes, and it ought to be possible on a first-class route, with aerodromes and so forth, for large commercial craft to make their way. The Cape to Cairo route, on which £50,000 has been spent, is now practically complete. The present state of the scheme is this, that we want an incentive from South Africa as great as was offered by Australia to induce the civil aviation interests in this country to compete in the Cairo to the Cape flight, and I do think the great millionaires of the Rand might well make an offer of a prize equal to that which was given by the Government of Australia, and so offer an incentive to use this route. The route will be kept up by the different local Governments through which it passes. That is our policy, to negotiate with them to take over these landing grounds, keep them clear of the bush, and guard the stores of petrol and other commodities which are placed there, so that what has been done once will not fade away into the jungle altogether.

In the debate on the Report Stage on December 15, Mr. Churchill, replying to question, said that broadly speaking they were going to provide means by which men may enter the ranks of the Air Force, and may rise to be flying officers, but they will, he thought, in the future as in the past, relegate the conduct of the flying machines in the main to commissioned officers. Dealing with the question of new uniforms, Mr. Churchill said it involved no additional expense, because they made the strictest rule that every officer had to wear out his old clothing before adopting the new pattern.

On the question of the helicopter, he said there was no doubt that if civil aviation was to achieve really wide development, it must be through the agency of some quite different kind of aeroplane to that used at present. If this invention were successful it would give us a machine, which, if the engines stopped, would descend like a parachute without anyone being hurt. Investigation showed that it was by no means impossible, scientifically and theoretically, that the helicopter machine would not only rise and descend perpendicularly, but also progress laterally at great speed, although the last claim was not made by the inventor, Mr. Brennan. As long as there was any hope of a favourable result being arrived at he would see that the experiments were continued.

With regard to Lord Rosebery's farm at Sumhouse Mr. Churchill said the matter was not now at a stage in which it could be benefited by a discussion in the House, and he proposed to let matters take their course. The £50,000 for the London-India route was for the preparation of the aerodromes and accommodation at Cairo, Baghdad and Karachi. These were all places where we have our garrisons of air force for military purposes, because they expected to hold the Middle East theatre largely through the instrumentality of the air. It would be convenient to allow mail and civil flying over the route as the stations have to be there any way.

Mr. E. Kelly urged the great necessity for having two main aerodromes in Ireland, one in the south-west and the other in the north-west, in view of the establishment of trans-Atlantic flying.

THE ROYAL AIR FORCE

London Gazette, "December 12"

The following officers have been granted short service commissions in the ranks stated, with effect from Dec. 12. They will retain their seniority in the substantive rank last held by them prior to the grant of the short service commission.

In the case of officers now gazetted Flying Officer or Observer Officer from Pilot Officer or Prob. Flight Officer, seniority will date from the date of Gazette:—

Flight Lieutenants.—G. H. Hopper, M.C., D.F.C. (A.); C. T. Lally, M.C., A.F.C. (A.), C. E. M. Pickthorn, M.C. (A.), E. M. Pollard (A.), F. J. Powell, M.C. (A.), R. S. Smith (K.B.).

Flying Officers.—G. H. Allison (A.), M. Ballard (A.), G. C. Bladon (A.), M. Burbidge (A.), R. Clelland (T.), J. Cottle, D.F.C. (A.), F. H. Davies, M.C. (A.), N. L. Desoer (A.), L. C. Dodkins (A.), C. A. Elliott (T.), E. T. H. Ellis (A.), W. V. N. Grant (A.), B. R. Harris (A.), L. N. Hollinghurst, D.F.C. (A.), J. S. Hughes (A. and S.), S. Jones, D.F.C. (A.), H. R. Junor, D.F.C. (A.), E. G. Keeping (A.), J. L. Kirby (A.), I. E. McIntyre, A.F.C. (A. and S.), H. W. McKenna, D.C.M. (T.), G. Martyn (A.), A. Miller (A.), J. L. Montgomery (A.), F. A. Norton (A. and S.), G. S. Oddie (A.), R. M. Rankin (A.), N. M. S. Russell (A.), A. W. Saunders, D.F.C. (A.), W. J. Seward (A.), O. E. Sharpe (A.), B. E. S. Smith (A.), R. de L. Stedman (A.), C. F. Toogood (A.), F. R. Wynne (A.).

Observer Officers.—H. A. Cooper, M.C., A. J. Cox, R. S. Greenslade, E. Major Greenwood, W. G. Hanton, P. Hardy, M.C., R. McK. Jamison, D.F.C., C. H. F. Nesbit, G. L. Nicholson, J. J. W. Nicholson, D.F.C., A. E. Reynolds, A. D. Sinclair, G. R. Terry, A. F. Wynne.

Flying Officers (from Pilot Officers).—E. A. C. Britton (A.), H. A. Dinnage (T.), F. R. Eason (A.), D. D. MacA. Eastwood (A.), E. N. Fenton (A.), H. W. Gill (A. and S.), D. E. Hall (A. and S.), E. N. Hewitt (T.), C. E. Howley (A.), D. G. R. Lord (A.), J. A. McDonald (T.), J. W. F. Merer (A.), W. Parkinson (T.), W. E. Purdin (A. and S.), B. H. C. Russell (A.).

Observer Officers (from Pilot Officers).—H. Alexander, L. W. Beck, C. G. Boothroyd, D.F.C., F. W. Brown, R. A. Brunton, M.C., A. H. Darnbrough, J. Davison, L. J. Hoare, W. McGowan, B. J. Malyan, D. H. Murray, R. T. Rich, H. Taylor, M.C., A. L. Willcox.

Flying Officer (from Probationary Flight Officer—late R.N.A.S.).—D. C. Duncan (A.).

The notifications appearing in the London Gazettes of the dates indicated below, appointing the following officers to short service commns., are cancelled:—Flying Officer G. A. F. Gibson (T.) (substituted for notification in the Gazette of Nov. 28); Sept. 12. Flying Officer E. A. M. Waterton (A.); Oct. 24. Flying Officer B. Turner (A.P. T.); Nov. 11. Flight Lieut. G. M. Boushrey (A.); Nov. 28.

The rank of Observer Officer G. S. L. Hayward, M.C., is as now described, not Flying Officer (A.), as stated in the Gazette of Oct. 24.

ROYAL AIR FORCE

Flight-Lieut. K. H. Riversdale-Elliott (A.) is granted a permanent commn. in the rank stated, with effect from Aug. 1.

The following temp. appointments are made:—

Staff Officer, 2nd Class.—(T.) Sqdn.-Leader H. Stanley-Adams, D.S.C.

Staff Officer, 3rd Class.—(T.) Flying Officer O. W. de Putron; Nov. 11.

Flying Branch

Sec. Lieuts. to be Lieuts.:—A. McK. Matheson; Feb. 22. C. A. B. Caukwell (since demobilised); March 26. H. Edge; May 28. G. C. Lugg; June 6. P. Fish; June 18. M. Tallentire; July 5. A. H. Allingham (since demobilised); July 20. S. P. Watts; July 24. A. Findley; July 30.

Pilot Officers to be Flying Officers:—H. B. Williams; Aug. 23. K. W. Jones; Nov. 8.

M. B. D. Whiteside (Lieut., High. L.I.) (since deceased) is granted a temp. commn. as Sec. Lieut., and to be Hon. Lieut.; May 31, 1918.

Pilot Officer (Hon. Flying Officer) L. R. Hibbert (Capt., R. Lanc. R.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 18.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. D. R. Bradley; Aug. 10, 1918; Capt. N. MacMillan, M.C.; June 10. (Then follow the names of 112 officers who are transfd. to the Unemployed List under various dates.)

Capt. S. E. Adams relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Dec. 4.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—S. Scotthill (caused by wounds); Aug. 14 (substituted for notification in *Gazette* of Aug. 26). J. J. Lancot (contracted on active service); Sept. 28.

Lieut. C. W. D. Bell (Lieut., P. of Wales Hrs.) resigns his commn.; Oct. 1.

Sec. Lieut. G. R. Howard relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Dec. 5.

Sec. Lieut. R. Shillinglaw is antedated in his appointment as Sec. Lieut. (O.); Aug. 8, 1918.

The notification in *Gazette* of May 31, 1918, concerning Sec. Lieut. H. P. Brumell is cancelled.

The notification in *Gazette* of Nov. 5, 1918, concerning Sec. Lieut. E. G. Boyle is cancelled.

The notification in *Gazette* of March 11 concerning Sec. Lieut. L. Edwards, M.C., is cancelled.

The notification in *Gazette* of June 24 concerning Capt. N. MacMillan, M.C., is cancelled.

The notification in *Gazette* of Sept. 5 concerning Sec. Lieut. (Hon. Capt., L. R. Hibbert) is cancelled.

Administrative Branch.

Pilot Officers to be Flying Officers:—M. W. Taplin; Oct. 1. A. J. Burge; Nov. 20.

F. H. Bacque (Capt., Can. E.F.) is granted a temp. commn. as Capt.; June 1, 1918.

M. H. Toy (Capt., Canadian Militia) is granted a temp. commn. as Capt.; Aug. 1, 1918.

Sec. Lieut. E. McM. Spinney (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut., and to be sec'd. to R.E.; May 6, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Capt. J. P. Cherry, M.C. (Capt. and Qmr., Dur. L.I.); April 15 (the notification in *Gazette* May 2 is cancelled). Flying Officer F. D. Wright (Lieut., S. Lancs. R.); Nov. 7. Flying Officer G. B. Booth (Lieut., Midd'x R.); Nov. 26. Flying Officer A. Webb (Lieut., 5th Dgn. Gds.); Dec. 1.

Flying Officer (actg. Flight-Lieut.) E. S. C. Brooks (Lieut., Cameronians and Sco. Rif.); Dec. 3.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

Lieut. J. H. Thompson; Sept. 29 (substituted for notification in *Gazette* of Nov. 4, wherein this officer's rank was shown as Sec. Lieut.). Lieut. V. N. Bonnes, Sec. Lieut. P. H. Brodziaik; Oct. 9. Sec. Lieut. W. J. Begley, Lieut. C. T. L. Bowley, Lieut. T. S. Cowperthwaite, Capt. H. C. Jones; Nov. 7 (substituted for notifications concerning the above named officers in *Gazette* of Nov. 21).

Sec. Lieut. T. H. Nunn; Nov. 16. Maj. H. Perry, Sec. Lieut. K. M. Vaughan; Dec. 2. Sec. Lieut. W. T. A. Jacob; Dec. 4.

Capt. E. P. L. Baker (S. Staffs. E., S.R.) relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Nov. 29.

Lieut. W. J. Banham relinquishes his commn. on account of ill-health (contracted on active service), and is permitted to retain his rank; Dec. 4.

Sec. Lieut. J. G. Le Brun relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Lieut.; Dec. 5.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—W. J. Cooper (contracted on active service), E. H. McNery; Dec. 5.

Technical Branch

Sec. Lieut. L. Hawkins to be Lieut., Grade (A.); Dec. 23, 1918 (this notification does not affect the notification concerning this officer which appeared in *Gazette* of Aug. 29).

Lieut. J. H. Ferguson, M.B.E. (Sec. Lieut., Extra Reg. Employed List) resigns his commn.; Dec. 13.

(Then follow the names of 16 officers who are transfd. to the Unemployed List under various dates.)

The surname of Sec. Lieut. B. J. Beech is as now described and not "Beach" as stated in *Gazette* of Feb. 7.

The notification in *Gazette* of Dec. 31, 1918, concerning Sec. Lieut. J. S. Card is cancelled.

The notification in *Gazette* of Nov. 25 concerning Lieut. H. D. Patterson is cancelled.

The notification in *Gazette* of Dec. 24, 1918, concerning Sec. Lieut. L. Hawkins is cancelled.

Physical Training Branch

Lieut. J. Butterfield relinquishes his commn. on ceasing to be employed, and is granted the rank of Capt.; Sept. 28 (substituted for notification in *Gazette* of Nov. 7).

Chaplains' Branch

Rev. W. Moffat, R.A.C.D., is granted a temp. commn. as Chaplain, with the relative rank of Capt., and is granted the relative rank of Colonel while employed as Principal Chaplain; March 7.

The notifications in *Gazettes* of Feb. 4, March 28, May 9, May 20, and June 24, concerning the Rev. W. Moffat are cancelled.

Memoranda

(Then follow the names of 6 Cadets who are granted hon. commns. as Sec. Lieuts.)

Flying Officer W. Myers, M.C., D.C.M. (Lieut., North'd Fus.), relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 20.

Sqdn.-Leader (actg. Wing Com.) R. Hall, O.B.E. (Capt., R. Welsh Fus.) relinquishes his temp. R.A.F. commn. on return to Army duty; Nov. 1 (substituted for notification in the *Gazette* of Nov. 11, wherein this officer was shown under "Flying Branch").

The following temp. Hon. Lieuts. relinquish their commns. on ceasing to be employed:—W. M. Harrison, W. Ramsay; Sept. 16. W. G. Knight; Oct. 2.

(3 officers transfd. to the Unemployed List.)

The notification in the *Gazette* of Aug. 1, appointing Capt. J. Gilmour, D.S.O., M.C. (A.), to a permanent commn. is cancelled.

The following temp. appointment is made at the Air Ministry:—

Staff Officer, 1st Class.—(Q.) Maj. A. L. C. Neame; Mar. 19, and to be actg. Lieut.-Col. till April 30 (substituted for notifications in the *Gazettes* of June 3 and Nov. 28).

The following temp. appointment is made:—

Staff Officer, 3rd Class (P.).—Lieut. V. Strandens, and to be actg. Capt. whilst so employed; June 11, 1918. Vice-Capt. A. E. Hartley (substituted for notification in the *Gazettes* of Aug. 6, 1918, Oct. 4, 1918, and Nov. 20, 1918).

Flying Branch

Sqdn.-Ldr. H. F. A. Gordon, O.B.E., to be Sqdn.-Ldr. (A. and S.), from (S.O.); Nov. 1.

Lieut. C. D. Palmer (Lieut., Arg. & Suth'd Highrs.) is granted a temp. commn. as Observer Officer on re-seconding from Arg. & Suth'd Highrs.; Nov. 24.

Sec. Lieuts. to be Lieuts.—L. G. Spinney; Apr. 27, 1918. F. Ibbotson (since demobilised); Oct. 26, 1918. W. Z. Grandi; Jan. 27. L. A. West; May 8. R. M. Guiney; May 30. R. Tindle; July 5.

Pilot Officers to be Flying Officers.—J. Duncanson; Aug. 2. G. W. Sweeney; Aug. 3. S. C. Millar; Aug. 7.



PERSONALS

Deaths

Lieut. STANLEY BLACKALL, late R.A.F., who died as the result of an aeroplane accident, at Croydon General Hospital, on December 13, at the age of 32, was the fourth son of Rev. Walter Bradley, late Vicar of Birchfield, Birmingham.

Lieut. I. F. GEORGE, D.S.M., R.A.F., late R.N.A.S., who was reported missing when returning from a raid on August 26, 1918, and is now officially presumed killed on that date, at the age of 25, was the youngest son of Mr. and Mrs. George, of "Beltinge," Cranford, Middlesex.

It is with great regret that we have to record the death of Mr. JOSÉ WEISS, who was one of the British pioneers and worked most painstakingly first with gliders and later with power driven machines, in which both the body and the wings were given the characteristic shape of a bird.

Married

GEOFFREY NORTON ALLEN, only son of Mr. and Mrs. Alex. W. Allen, Stamford House, Bedford, was married on December 2 at Christ Church, Galle Face, Colombo, Ceylon, to CECIL MARGARET WARLOW, younger daughter of the Rev. E. J. Warlow, late Archdeacon of Lahore.

Maj. JOHN WILLIAM KIDSTON ALLSOP, late R.N.A.S. and R.A.F., son of the late T. W. Allsop, and Mrs. Allsop, of Langland Mansions, Hampstead, was married on December 4 at the Savoy Chapel, to FRANCES, daughter of the late C. W. HUBBARD, J.P., and Mrs. Hubbard, of Riversdale, Sleaford, and granddaughter of the late W. Bedford, J.P., of Allan House, Boston, Lincs.

Capt. CUTHBERT GEORGE BELLORD, late R.A.F., elder son of Mr. E. J. Bellord, Hampstead, was married on December 9 at St James's, Spanish Place, to MARGARET ISABEL, elder daughter of Sir Alexander CARDEW, K.C.S.I., and Lady Cardew.

Lieut. ERIC M. GREENWOOD, R.A.F., son of Dr. and Mrs. George Greenwood, of Goswell Road and Harrow, late of Enfield, was married on November 19 in Calcutta Cathedral, to JEANNE EDITH, only daughter of the late M. and Mme. GEORGE FAVREAU, of Bochefort-sur-Mer, France.

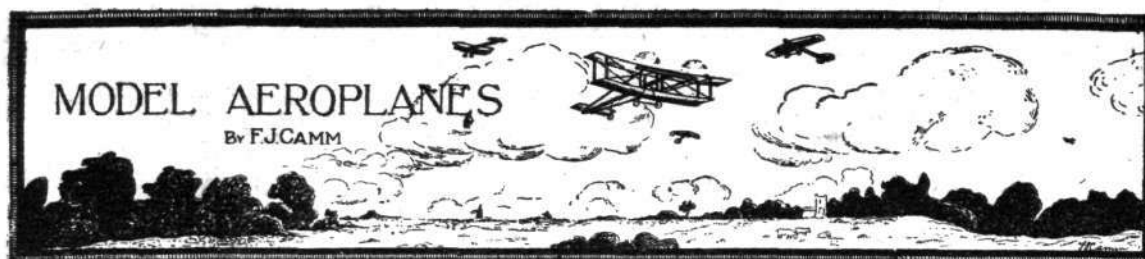
Lieut. E. S. WHEATLEY, D.F.C., son of Col. H. S. Wheatley, C.B., S.M., and Mrs. Wheatley, of The Knoll, Farnham, was married on December 4 at All Souls', Langham Place, to DOROTHY, eldest daughter of Dr. Alexander and Mrs. HODGKINSON, of Bradshaigh, Farnham, Surrey, formerly of Manchester and Wilmslow.

Capt. GEORGE FERGUSON WILSON, late of Seaforth Highrs., attached to R.A.F., was married on December 18 at Epsom, to Mrs. WILHELMINA MARGARET BRIDLE, younger daughter of Mr. and Mrs. T. O. L. Becker, of "St. Goar," Barnet Wood Lane, Ashted, Surrey.

To be Married

The engagement is announced between Capt. LESLIE CLARKE, A.F.C., R.A.F., and WINIFRED, youngest daughter of Mr. and Mrs. S. A. JACKSON, of St. Anne's-on-the-Sea.

The engagement is announced between Lieut. E. L. RIDLEY, R.A.F., elder son of Mr. and Mrs. W. E. Ridley, of Heathfield, Coulsdon, Surrey, and LESLIE, younger daughter of Mr. and Mrs. ST. CLAIR BOLTON, of 6, Hyde Park Mansions, W.



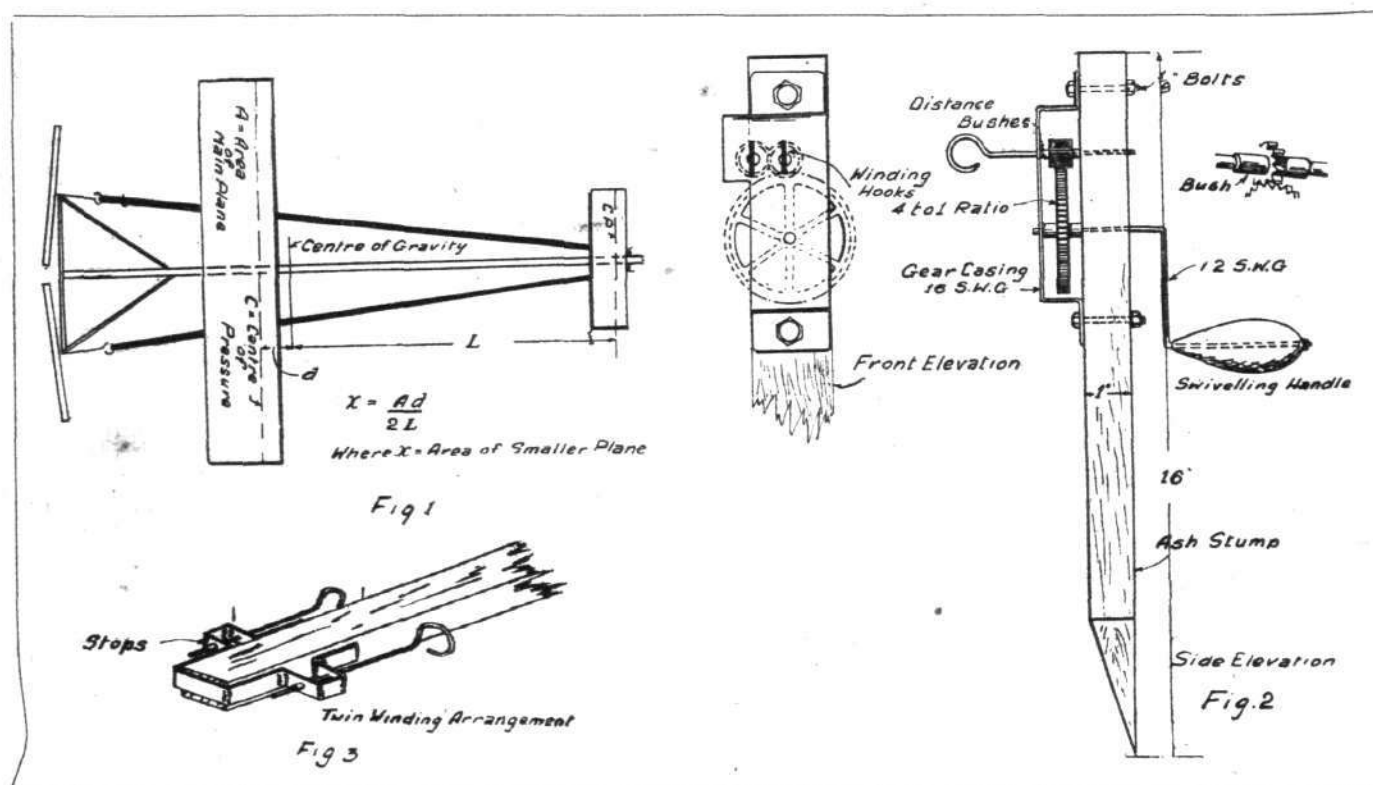
NOTE.—All communications should be addressed to the Model Editor.

Calculating Areas

THE calculation illustrated diagrammatically by Fig. 1 relates to the problem of finding the correct disposition of surfaces without resorting to a trial flight. In power-driven machines the trial and error method may easily result in a disintegrated plant, and it is therefore advisable to adopt a more certain method of ensuring that the centres of pressure and gravity are coincident, and thus obviating the necessity of making several small surfaces in order to obtain one of the correct area. It is assumed that the machine is complete

I have checked this formula against many machines, and it has proved itself to be remarkably accurate. A compressed-air model recently constructed by the writer flew at the first attempt and the area of its elevator had been calculated by means of this formula. With the ordinary flying stick it is so very easy to vary the position of the main plane that it would be unnecessary to adopt this method, but as larger machines are contemplated it becomes increasingly difficult to have to move the main plane, once it is fixed.

There is another simple formula relating to hydroplanes



with the main plane fixed in position. The machine should be poised by suspending it by a fine line until it balances in a longitudinal direction; this gives the position of the centre of gravity which should be marked on the fuselage. Now, knowing the area of the main plane and the position of the centre of gravity, it is really only a simple proportion sum to determine the area of the small surface (an approximate weight for which should be fixed to the fuselage when finding the position of the centre of gravity). The formula for calculating the area of the smaller surface is:—

$$x = \frac{A d}{2 L}$$

Where x = area of surface to be found

d = distance of centre of gravity of machine to the centre of pressure of the main plane

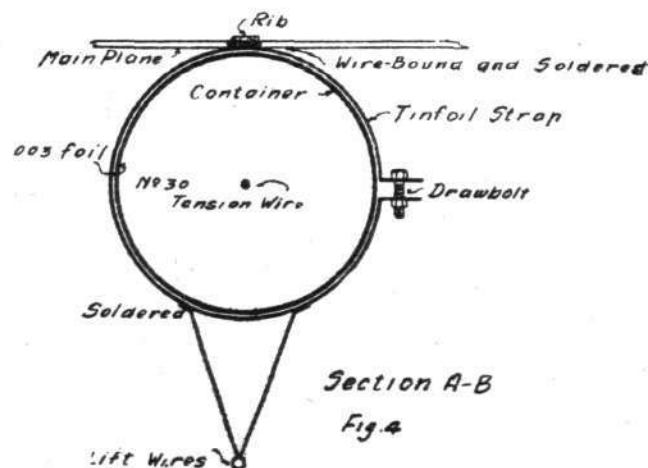
L = distance of centre of gravity of machine to the centre of pressure of the elevator.

The centre of pressure of the main plane can safely be assumed (with cambered surfaces) to lie at a point two-fifths of the chord from the leading edge, and a line drawn transversely through this point is the line on which the pressure affects the plane.

The coefficient 2 in the formula is a constant to allow for the positive angle made by the elevator, since a canard machine is being considered. The angle of incidence of the elevator should be nearly twice that of the main plane. To work an example, suppose that A measures 300 sq. ins., L = 40 ins., and d = 5 ins.,

then x will equal $\frac{300 \times 5}{2 \times 40} = 18.6$ sq. ins.

which many do not seem to be cognisant of. I refer to the calculation of the flotation capacity needed to support a given weight. The machine exclusive of floats should be



weighed and an ounce or so allowed for the weight of them. Suppose the model weighs 8 oz. \times 3 oz. for floats = 11 oz., the capacity of the floats are calculated in the following manner. A cubic foot of water = 1,728 cubic ins., weighs

1,000 oz. approximately. Then, to float 11 oz., the capacity of the floats must at least be:—

$$\frac{1,728}{1,000} \times \frac{11}{1} = 19 \text{ cubic ins.}$$

Now, since it is essential that the floats should only be about one-fourth immersed it follows (since weight equals displacement, therefore 19 cubic ins. would only just support the machine), that the total cubic capacity should be $4 \times 19 = 72$ cubic ins.

The point is that floats must be made which will displace four times the model's weight of water in order to efficiently float the machine.

A Durable Twin-Winder

In Fig. 2 I show a twin-winding apparatus that can be used without the aid of a second party to support the machine—a disadvantage of the ordinary converted egg whisk type of winder. It is intended for use in conjunction with a simple apparatus to be fixed to the front of the model, and when in use it is forced into the ground, thus leaving one hand free for winding and the other for supporting the machine. Fig. 3 shows the attachment fitted to the nose of the model.

THE AIR ESTIMATES

In our last issue we gave the main divisions of the Air Estimates for the year 1919-20, amounting to £54,030,850, together with Mr. Churchill's statement and now we supplement this with a detailed statement, showing how the two largest items—pay, etc., and technical and warlike stores are split up.

The sum which it is estimated will be required for the pay of the R.A.F. is divided under nine sub-headings, showing the following details:—

Pay and personal allowances of officers	£ 4,600,000
Pay and personal allowances of men	6,400,000
Separation allowance	2,250,000
Miscellaneous allowances	500,000
Women's Royal Air Force	900,000
Civil employees	1,601,000
Service gratuities to officers and to men on discharge	5,100,000
Air Force Reserve	30,000
Recruiting staff and expenses	120,000
Gross total	£21,501,000
Deduct appropriations in aid	450,000
Net total.. .. .	£21,051,000

The details of the proposed expenditure of £19,322,850 on technical and warlike stores are as follows:—

The apparatus consists of two pinions in gear with one another and driven by a wheel, the ratio between them being 4 to 1, that is to say, one turn of the crank imparts four turns to each pinion shaft. A higher gear should not be used, as the two skeins are being wound synchronously.

Each pinion shaft-extension is formed into a hook to engage with the attachment on the machine, the pinions themselves being kept central between the gear casing by means of the distance bushes shown in detail. The gear casing should be of brass, and the gears can conveniently be those sold for geared elastic motors. Winders can also be improvised from ordinary hand braces, although rather low geared.

A friend of the writer's (a wag in his way) made a winding attachment to gear off the back wheel of his cycle. The cycle was inverted and a friction-driven pulley held against the tyre by means of springs; this drove the chuck. It was an inefficient arrangement, and after several machines had been smashed due to unequal winding (whereat the projector of the idea was glad to use the cycle to escape the wrath of his dupes!) the idea was discarded.

(To be continued.)

	1919-20.
	£
Aeroplanes, seaplanes, engines and spares	1,413,000
Airships, airship engines and spares	144,000
Balloons, winches and spares	72,300
Aircraft technical and warlike stores	158,550
Armament and ammunition	168,200
Electrical and engineering stores	169,700
Hangars	64,500
Mechanical and other transport	23,000
Marine craft and equipment	7,500
Petrol and oil	1,522,100
Rewards to inventors	25,000
Aircraft supplies delivered under War Contracts	16,100,000
Aircraft Inspection Departments, salaries and wages	—
R.A.E., Farnborough, salaries and wages	—
Gross total	£19,867,850
Deduct—	
Appropriations in aid	545,000
Net total.. .. .	£19,322,850

Under the Vote for work, buildings and lands £5,072,000 is set aside for new works, additions, alterations and special repairs amounting to £2,000 each and upwards.

R.A.F. Cadets

AN unique document is the following list of names of the 55 candidates who were successful in the competitive examination held last month for admission to the Royal Air Force Cadet College, as it is the first of the kind to be published:—

Name.	Marks.	Name.	Marks.
*Mills, G. H.	9,908	*Keightley, C.F.	6,347
Buttar, C. P.	9,295	Gay, G. W.	6,320
*Henslowe, F. A.	9,108	Mackay, M. B.	6,308
Huxham, G. H.	9,098	*Whelan, R. D.	6,302
*Shepherd, G. C.	9,050	Lindsay, H. D. R. P.	6,239
Barrett, J. B.	8,929	Martin, J. L.	6,016
*Revington, A. P.	8,872	Goss, E. O.	5,948
Wilcock, W.	8,687	Pontifex, R. W.	5,811
Shortt, R. G.	8,673	Griffith, W. S. de G. D.	5,778
Brook, W. A. D.	8,485	*Kearon, H. V.	5,771
*Porter, N. A.	8,263	Desmond, T. J.	5,768
Waite, R. N.	8,249	Fleming, T. S. S.	5,689
Taylor, J. E.	7,812	Mitchell, F. G. S.	5,686
*Murphy, T. C. E.	7,402	*Davis, J. H. A.	5,651
*Stone, R. A. B.	7,394	*Gore, C. W.	5,643
*Johnson, S. H.	7,257	Spicer, G. H.	5,621
Loch, D. R.	7,131	*Bernard - Smith,	5,490
Rowe, F. C. T.	7,098	G. C. B.	
Boulton, H. L.	7,093	*Cooper, R. A. B.	5,438
Mangle, R. A. R.	7,043	Glenn, R. W. L.	5,115
*Brown, J. R.	7,041	Hawtrey, J. G.	5,086
Muir, J. E. R.	6,871	*Falconer, C. L.	5,071
Connolly, S. G.	6,865	Hayter, M. C.	5,054
Hayter-Hames, N. C.	6,810	*Spaight, R. H. S.	4,973
Faithfull, A. F.	6,797	Cooke, D. A. R. B.	4,938
Berridge, T. D.	6,707	Springfield, C. M. O. O.	4,909
*Combe, G.	6,371	*Lacey, E. V. S.	4,807
Royd, E. A.	6,351	Watts, G. E.	4,776

* These candidates have received 400 marks for military efficiency.

Air Customs Facilities at Hounslow at Christmas

THE Air Ministry announces that Customs Officers will not be in attendance at Hounslow between December 25 and 28 inclusive. Steps have been taken, however, by which their attendance can be arranged for on short notice. Owners or pilots of aircraft who desire to obtain a clearance to or from the Continent on these days should give notice to the Civil Aerial Transport Officer at Hounslow at least one hour before the attendance of the Customs Officer is required.

Sir Hugh Trenchard's Message

To the current issue of the *Ex-Service Man* Air-Marshal Sir H. Trenchard contributes the following message to ex-Service men: "I would like to say that I hope the ex-Service men will put their shoulders to the wheel in peace as they did in war, and help to pull the country through these difficult times. I wish them every good fortune in their work. For those who have been unfortunate, and have not been able so far to obtain employment, I hope that this—their just reward for past services—will speedily be forthcoming."

R.A.F. Mess Uniform

WE understand that the pattern for the mess dress of officers of the Royal Air Force has been officially approved. Particulars can be obtained from the principal military tailors.

Capt. Ross-Smith's Progress

IN his flight from Port Darwin across Australia, Capt. Ross-Smith has not been quite as lucky as in his flight from England. He left Port Darwin on the morning of December 13, and the following day he was reported at Newcastle Water. Then followed a silence, explained by the fact that trouble with a propeller has entailed a forced landing about 20 miles before reaching Anthony's lagoon. Repairs were effected and he arrived safely at Camooweal (Queensland) on December 20.

SIDE-WINDS

MESSRS. SMITH AND SONS (M.A.) LTD. are proud of the fact, and rightly so, that the Vickers-Vimy-Rolls machine piloted by Capt. Ross Smith and Lieut. Keith Smith, which has achieved such a great triumph in flying from Britain to Australia in 28 days was equipped with the following Smith instruments and accessories:—Revolution indicators, airspeed indicators, Cambridge radiator thermometer, plugs and Huson compasses, Type 253. It is also worthy of note that every competitor in the Australian Competition had his machine equipped with Smith instruments, viz.:—Capt. Matthews (Sopwith); Capt. Wilkins (Blackburn Kangaroo); Lieut. Douglas (Alliance) and Lieut. Howell (Martinsyde).

THE Dissolved Acetylene Co., Ltd., 268, South Lambeth Road, familiarly known throughout the trade as D.A., held their Dinner, Annual, at the Horse Shoe Hotel, the Day After Friday of last week, when a large gathering of employees decidedly arose to the festive feeling prevalent and did justice to the excellent fare provided. In addition a distinguished assembly of visitors also entered whole-heartedly into the enjoyment both before and after meat. Mr. L. M. Fox, who has always the employees' interests at heart, occupied the chair, supported by Mrs. and Miss Fox, and under his ever-watchful eye no reveller was found neglected of due attention; in fact, every waiter, not forgetting Mr. Lucas, who had the arrangement in hand, was kept decidedly alert. Many interesting speeches were made regarding the developments ahead, also development achieved due assuredly to the loyalty of both the men and women of the firm. The evening closed all too soon, but no one failed to distinctly acclaim a grand evening.

AN observant visitor to both the Car Show and the Motor Cycle Show at Olympia noted a fine achievement by Messrs. C. A. Vandervell and Co., Ltd. He records that among cars fitted with lighting and starting sets the Acton firm were easily first, having their C.A.V. sets upon 128 cars, or 32 per cent. of the number of entire exhibits. At the Motor Cycle Show 148 machines were fitted with C.A.V. magnetos, practically the same large percentage.

It is interesting to note that every aeroplane, seaplane and airship which has crossed, or attempted to cross, the Atlantic was equipped with "Tabloid" First-Aid.

NEW COMPANIES REGISTERED

DAVIES AND STACK, LTD., 30, Bedford Row, W.C.—Capital £600, in £1 shares. Aeronautical, motor and general engineers, etc. First directors: E. J. V. Howard-Davies and A. R. Stack.
WHITEHALL INSURANCE CO., LTD.—Capital £100,000, in £1 shares. For carrying marine, aircraft and general insurance. Solicitors, Solam, Middleton and Co., Sunderland.

If you require anything pertaining to aviation, study "FLIGHT's" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages li, lii, liii and liv).

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

AERONAUTICAL PATENTS PUBLISHED

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 24, 1919.

16,951 and 17,005. FAIREY AVIATION Co. and C. R. FAIREY. Controlling devices for aeroplanes. (135,520 and 135,521.)

APPLIED FOR IN 1917

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 24, 1919.

3,725. FAIREY AVIATION Co. and C. R. FAIREY. Controlling devices for aeroplanes. (135,522.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919.

19,375. BLACKBURN AEROPLANE AND MOTOR Co. and H. BOOTH. Wing spars. (135,312.)

19,584. SOC. DES MOTEURS SALMON. Metal fitting for connecting structural members of aeroplane. (121,468.)

20,612. H. BLACKBURN. Parachutes. (136,337.)

20,643. S. E. SAUNDERS. Aircraft. (135,338.)

Published December 24, 1919.

8,675. A. DAVIES. Aerial, etc., propulsion. (135,529.)

10,485. R. ESNAULT-PELTERIE. Direct-acting I.C. engines. (118,091.)

10,594. FAIREY AVIATION Co. and C. R. FAIREY. Hydrovanes. (135,531.)

17,303. W. D. ODDY. Device for balancing propeller blades. (135,548.)

19,240. H. G. DEBNAM. Rotary I.C. engines. (135,566.)

19,479. G. GOODWILL. Instruments for ascertaining speed of aircraft. (135,585.)

19,618. H. F. PARKER. Aerial machines. (135,601.)

20,978. S. G. BROWN. Gyro-compasses. (135,664.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919.

8,590. J. HUSKISSON. Inclinator. (135,412.)

10,319. J. W. DICKSON. Means for securing aeroplane stay-wires. (135,420.)

16,918. J. BRIZON. Indicator for ground-speed of aircraft. (129,634.)

Published December 24, 1919.

21,194. SOC. DES MOTEURS Gnome et Rhone. Piston-rod connections. (132,249.)

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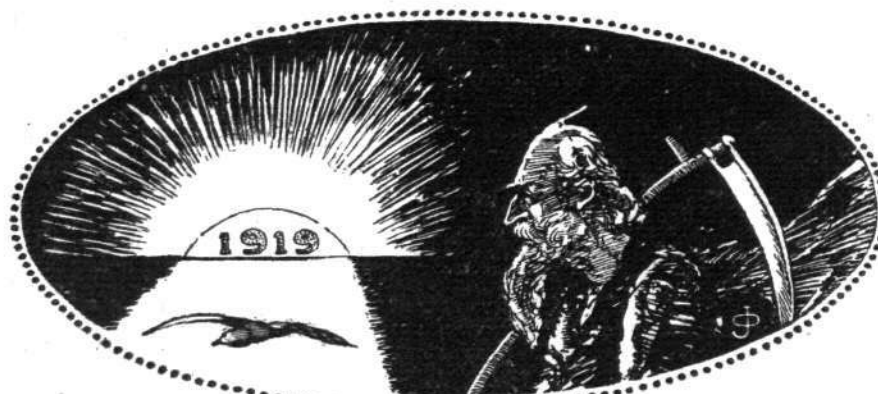
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FINIS TO VOL XI.